

m² – Re: Vision
A Collaboration

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Alice Ferguson Foundation

Potomac River Habitat Study Complex
at Hard Bargain Farm

Deepening Charrette Workbook

October 28th & 29th 2008



ANN ROTHMANN STRUCTURAL ENGINEERING LLC

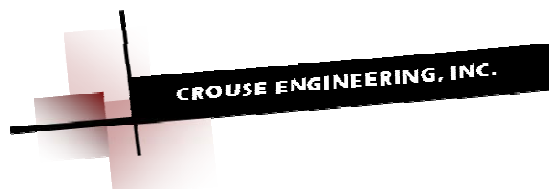


Consilience
LLC



A K F
engineers

andropogon
landscape architecture
ecological planning & design




MARION
CONSTRUCTION, INC.

Alice Ferguson Foundation

Potomac River Habitat Study Complex
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11. Living Building Challenge Summary
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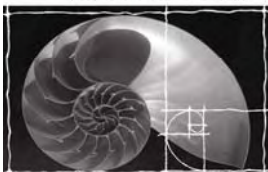


AGENDA SCHEDULE FOR POTOMAC RIVER HABITAT COMPLEX
DEEPENING CHARRETTE—OCTOBER 28

- 9:40 am – 10:00 am Coffee, Introductions [All]
- 10:00 am – 10:30 am: What Is This Project All About? [All]
 Review of Project Drivers: Goals and Touchstones (Tracy Bowen/Sandy Wiggins)
 Living Building Challenge Overview (Scott Kelly/Alex Vondeling)
- 10:30 am – 10:50 am How Did We Get Here? [All]
 Review of Process To Date and Key Data from Stakeholders (Muscoe Martin)
- 10:50 am – 12:45 pm Where We Are, Relative to Living Bldg Challenge & AFF Goals [All]
 Review Current Architectural Design and Connections HBF Priorities and LBC Goals (Muscoe)
 --Identify gaps and possible solutions
 Review Current Mechanical Design and Connections HBF Priorities and LBC Goals (Rob)
 --Identify gaps and possible solutions
 Review Current Landscape Design and Connections HBF Priorities and LBC Goals (Jose)
 --Identify gaps and possible solutions
 Review Current Structural Design and Connections HBF Priorities and LBC Goals (Ann)
 --Identify gaps and possible solutions
 Review of Possible Materials for Superstructure and Building Envelope (Muscoe/Alex)
 --Gather feedback from an aesthetic/cultural perspective on what AFF loves, what they hate
- 12:45 pm—1:30 pm Working Lunch [All]
 Presentation on What it Means to be Trash-Free (AFF)
- 1:30 am – 1:45 pm Phasing Goals and Issues [All]
 Presentation on AFF Phasing Goals (AFF)
- 1:45 pm – 3:15 pm What's Next? Team Meeting I [Design Team +]
 Energy Model Review (AKF, M2/RVA, Marion, ARothmann)
 Wastewater Flows (AA, Crouse, Nutricycle, M2/RVA)
 Integrated Education (AFF Stakeholders, M2/RVA)
- 3:15 pm – 3:45 pm Report Out from Team Meeting I [Design Team +]



Re: Vision
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3:45 pm – 5:30 pm What's Next? Team Meeting II [Design Team +]

Interdisciplinary Perspectives on Material Options (M2/RVA, AKF, Marion, ARothmann)

Boardwalk Design and Materials (AA, M2/RVA, Select AFF Reps)

Day One Goals:

- Re-familiarize team members & key stakeholders with project goals, process to-date, and current design
- Gather feedback from integrated team & key stakeholders on plans and systems in light of Living Building Challenge and Project Touchstones; identify additional strategies/opportunities to test
- Develop criteria for selecting materials and hone in on a materials palette (What's on the table? What's off?)
- Develop concrete design ideas for integrated education and trash-free facilities
- Identify AFF priorities for economical re-design of the boardwalk
- Deepen the integration of building systems (energy, nutrients, water), particularly in light of project phasing

AGENDA SCHEDULE FOR POTOMAC RIVER HABITAT COMPLEX
DEEPENING CHARRETTE—OCTOBER 29

8:30 am – 12:30 pm Architect/Contractor/Client Work Session [M2/RVA, Marion, Consilience]

Report out from Team Meeting II

Identify Architecture and Construction Efficiency Opportunities

Identify Opportunities for Salvaged, FSC, and Local Materials

Explore Phasing Strategies to Support AFF's Program Goals and Budget

Develop Outline of DD Schedule and Process for Continued integration of the Team's Work

**Alice Ferguson Foundation's
Potomac River Habitat Study Complex
September 27, 2006**

Our Values

The Potomac River Habitat Study Complex project must be an extension of our organizational spirit, culture, and values!

- Place for fun
- Place to breath
- Timeless
- Freedom, independence and space
- Explore, engage, think and learn
- Connection to land, life and community
- Foster wonder, excitement and amazement
- Real life happenings
- Creative Energy
- Teamwork
- Family oriented
- Quality over quantity
- Integrity, solid, committed
- Frugal, progressive, responsible
- A model for environmental, social and economic sustainability

**Our Project Touchstones
(guiding principles for decision-making)**

The Potomac River Habitat Study Complex project will:

- Make kids the Priority - everything is child-centered
- Protect our open space
- Protect the viewshed from Mount Vernon
- Preserve and protect the rural and historic character of Hard Bargain Farm
- Be comfortable and connected to nature
- Be healthy, with natural light and clean, fresh air
- Be adaptable, flexible spaces that can change over time
- Turn green building strategies into teaching and learning tools
- "Walk the talk" and inspire by example! - LEED, climate neutral, regenerative
- Be a trash-free facility!



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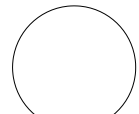
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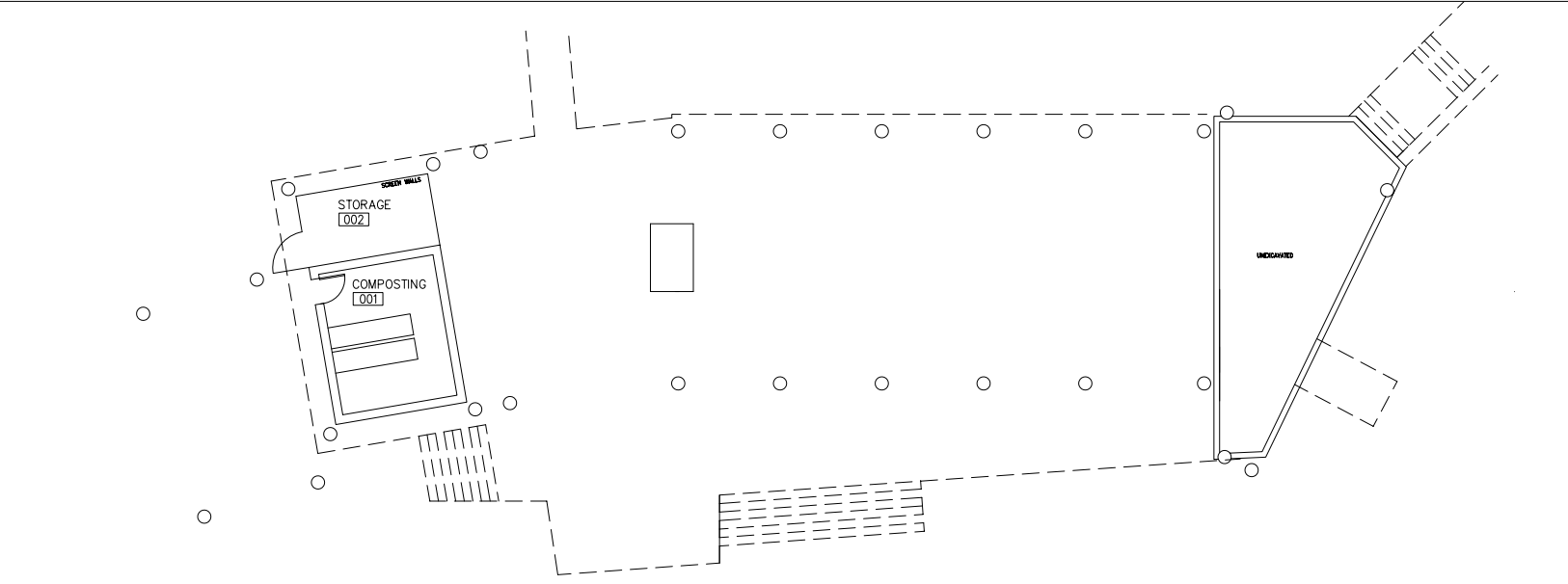


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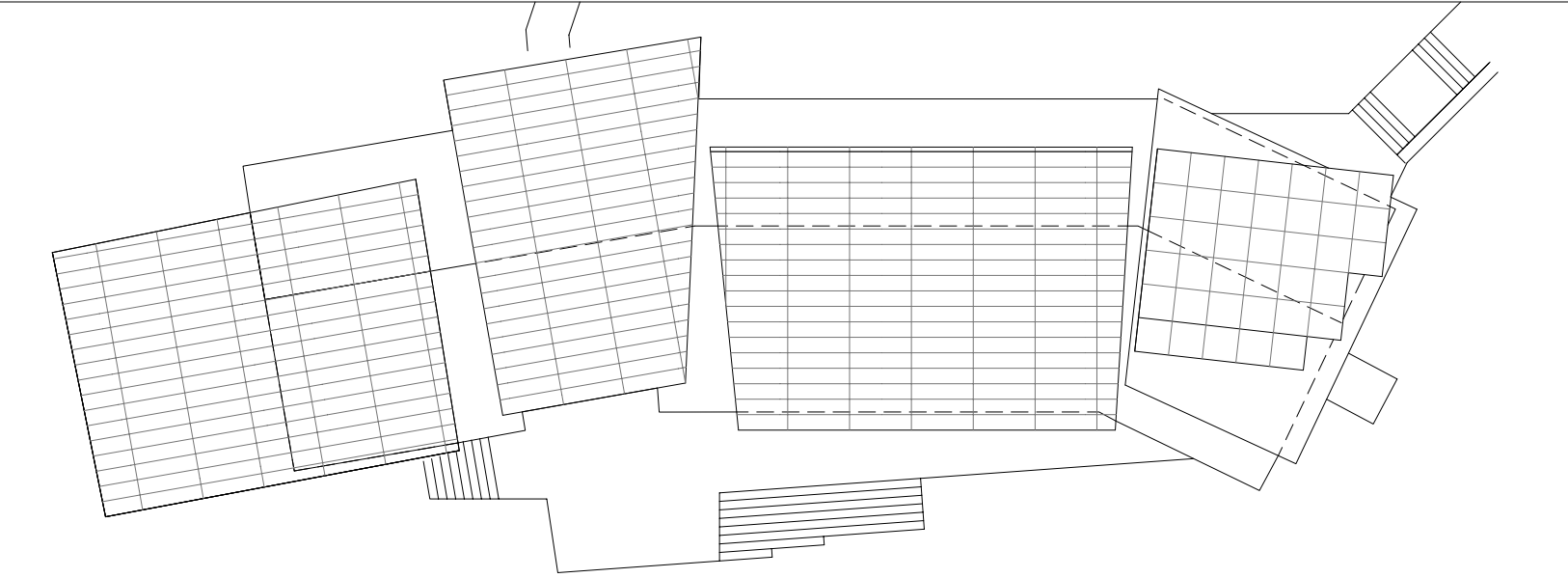
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'Grass' Building

Sheet No:
A-1-G

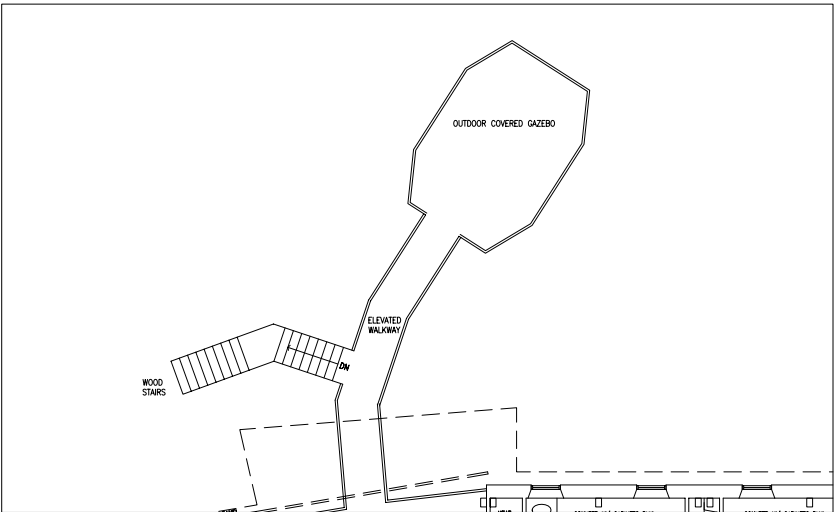
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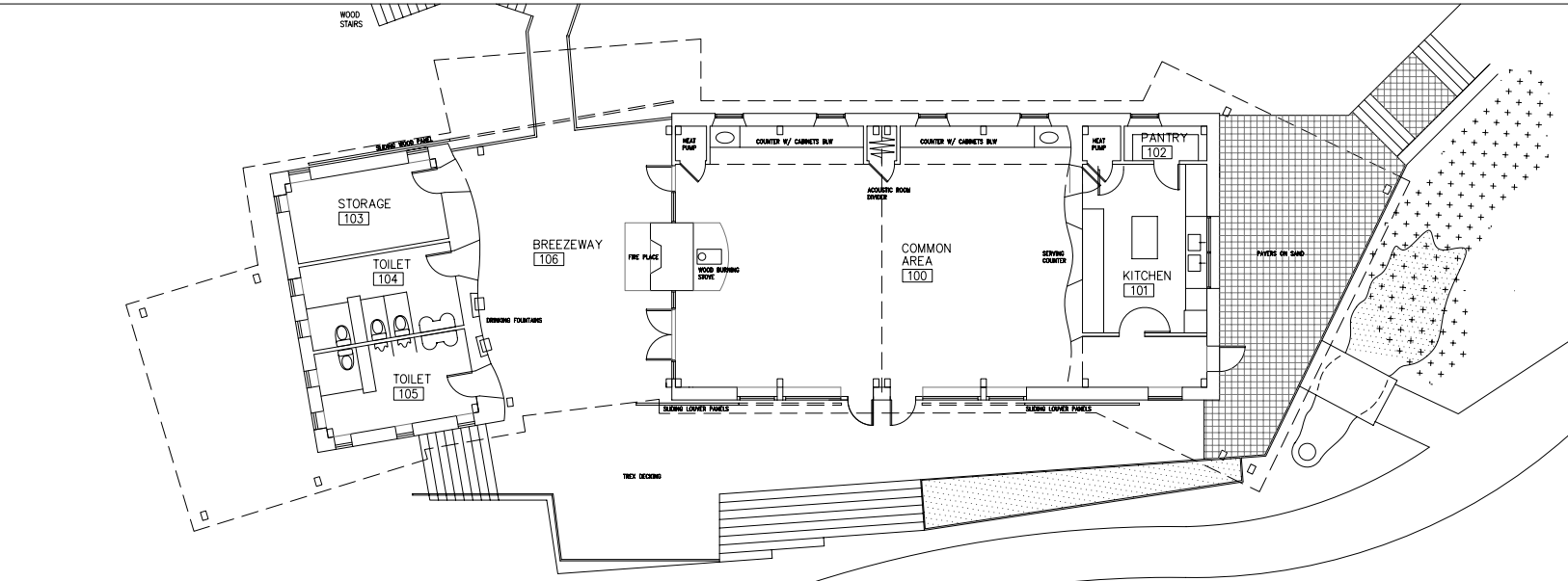
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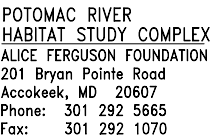
ROOF PLAN
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BRIDGE & GAZEBO PLAN
SCALE = 1/8" = 1'-0"



MAIN LEVEL PLAN
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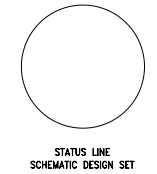
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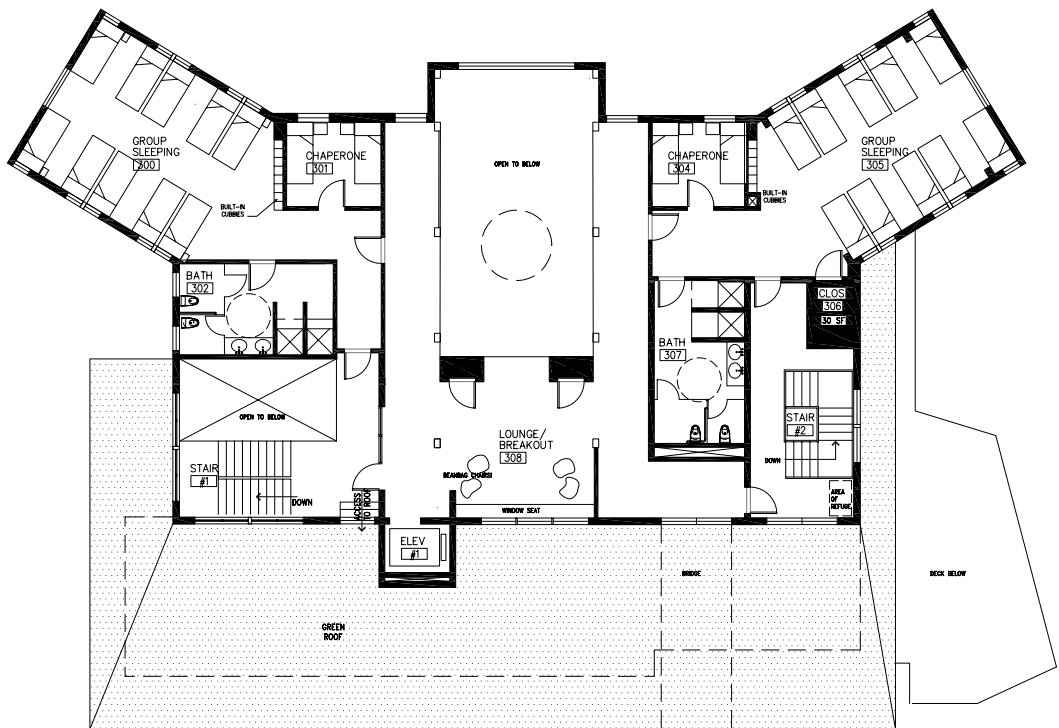
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|-------|---|
| L-1 | Site Layout - Overall |
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| L-3 | Layout & Materials - Wetlands & Boardwalk |
| A-1-G | Floor & Roof Plans 'Grass' Building |
| A-2-G | Exterior Elevations 'Grass' Building |
| A-3-G | Building Sections 'Grass' Building |
| A-1-M | Floor Plans 'Moss' Building |
| A-2-M | Exterior Elevations 'Moss' Building |
| A-1-C | Plans, Elevations & Section Cabins |



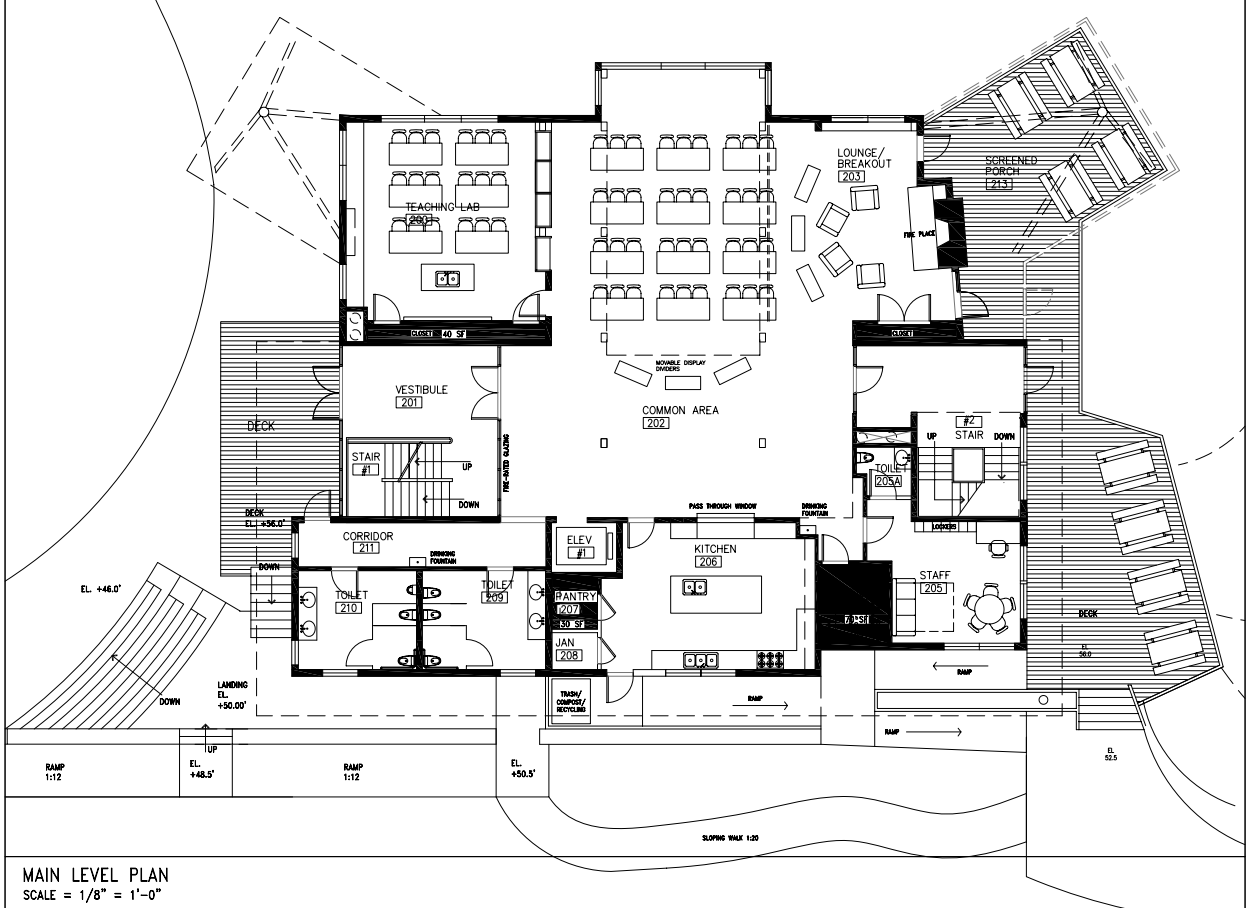
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'Moss' Building

Sheet No:
A-1-M

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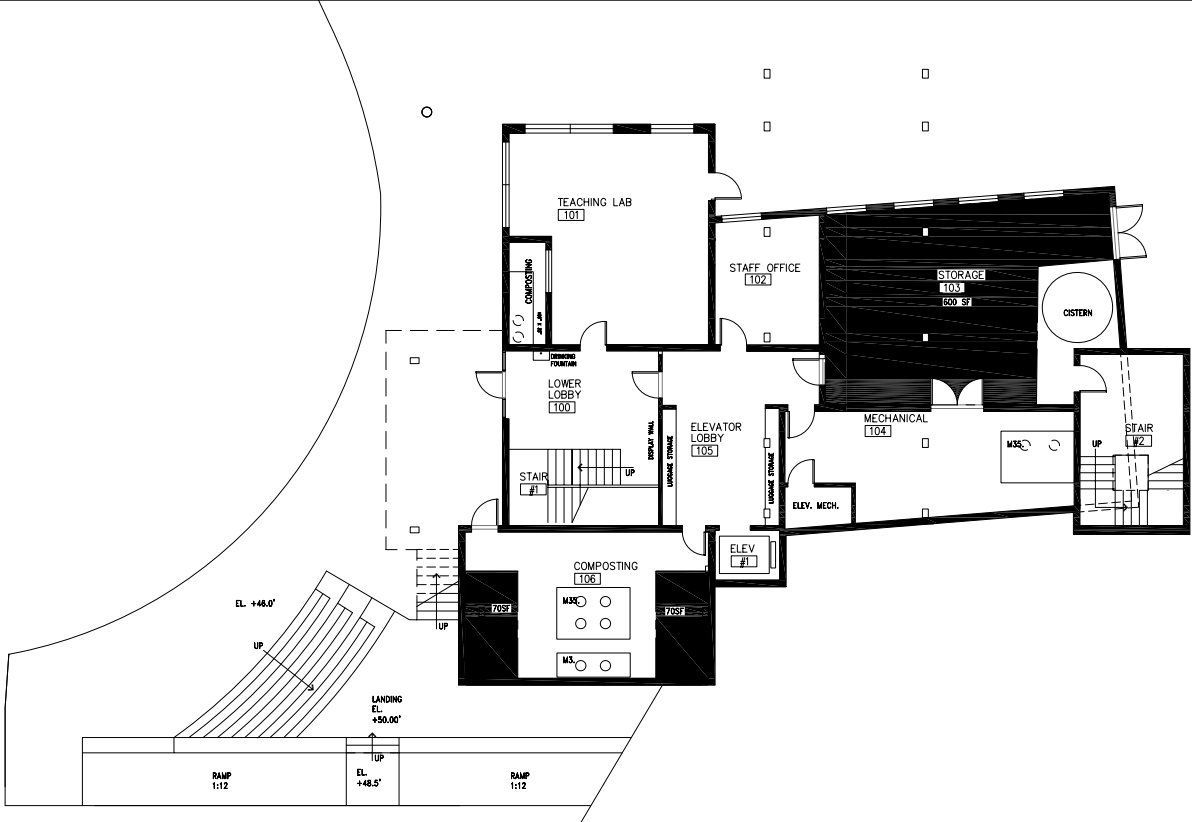


UPPER LEVEL PLAN
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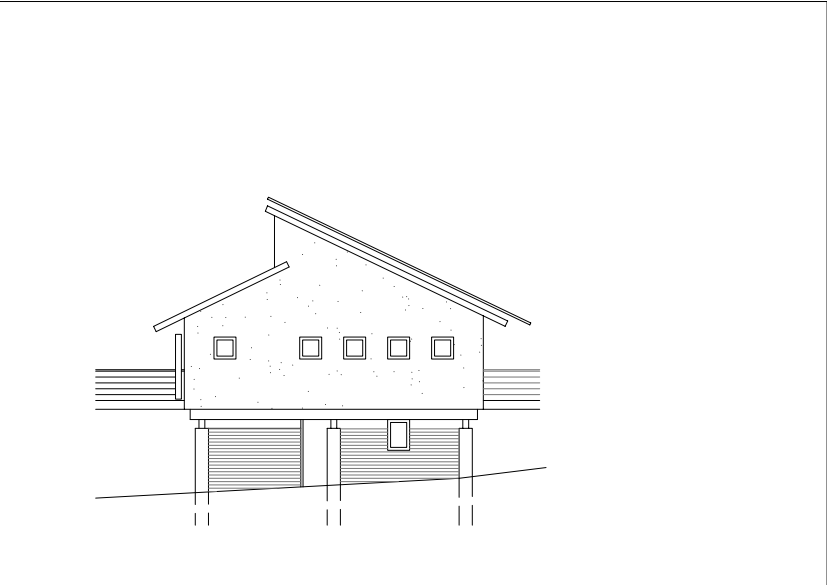


MAIN LEVEL PLAN
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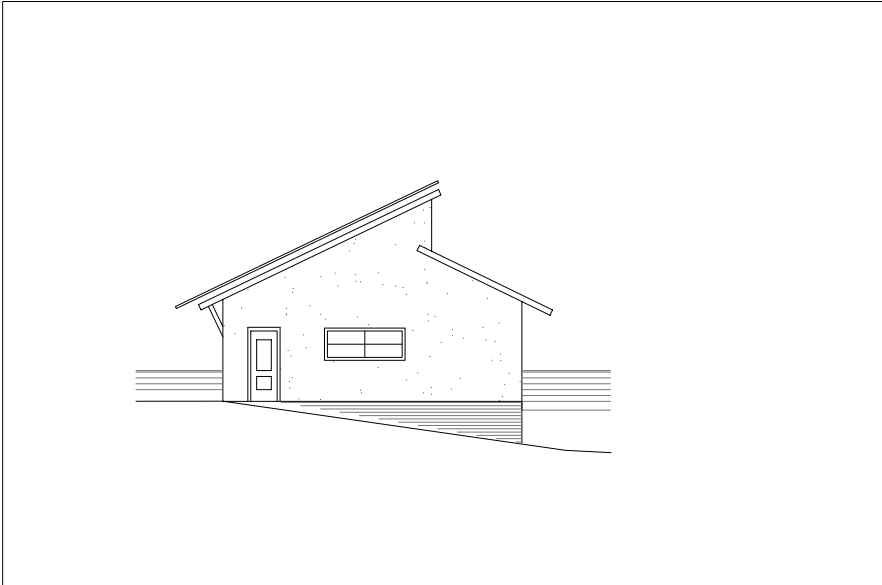
Existing Lodge	length	width	area
ATC	40	6	240
table/chair closet	12	5	60
Laundry Rm	19	6	114
TOTAL			414
PROPOSED			
Grass	length	width	area
Storage Room			270
Platery			40
Moss			70
Storage Room/lower level			600
Table/Chair Storage			70
Platery			30
Closet in classroom			40
Closet in Lounge			40
Closets (upper level)			45
GRAND TOTAL - proposed			1005
OUTDOOR COVERED STORAGE			
Area under Stor. Rm - Grass			135
Area under building - Moss			135
			135



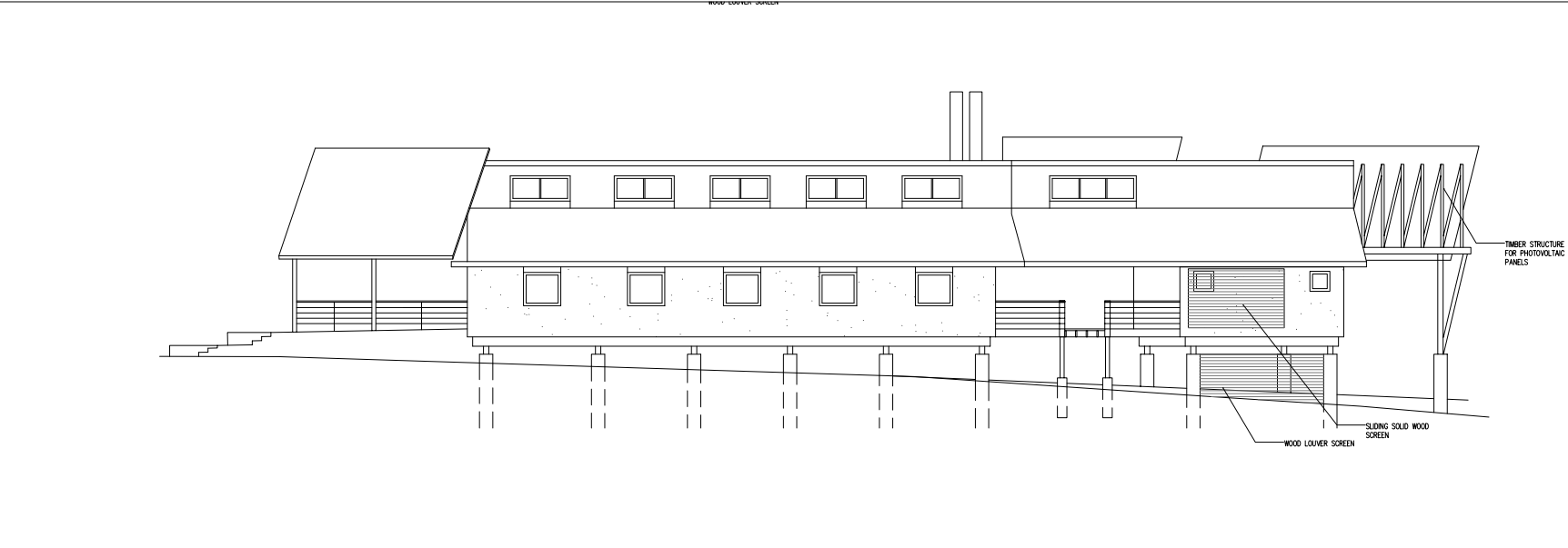
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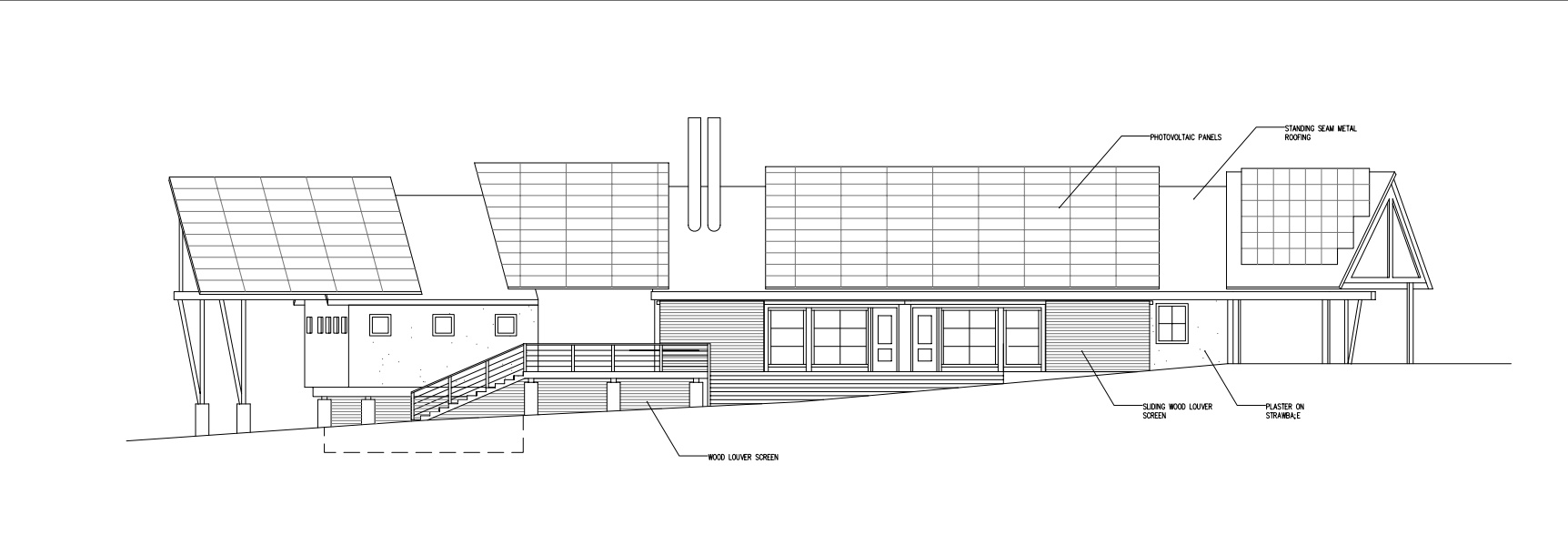
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EAST ELEVATION
SCALE = 1/8" = 1'-0"



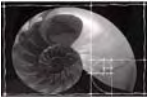
NORTH ELEVATION
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SOUTH ELEVATION
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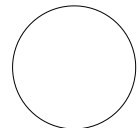
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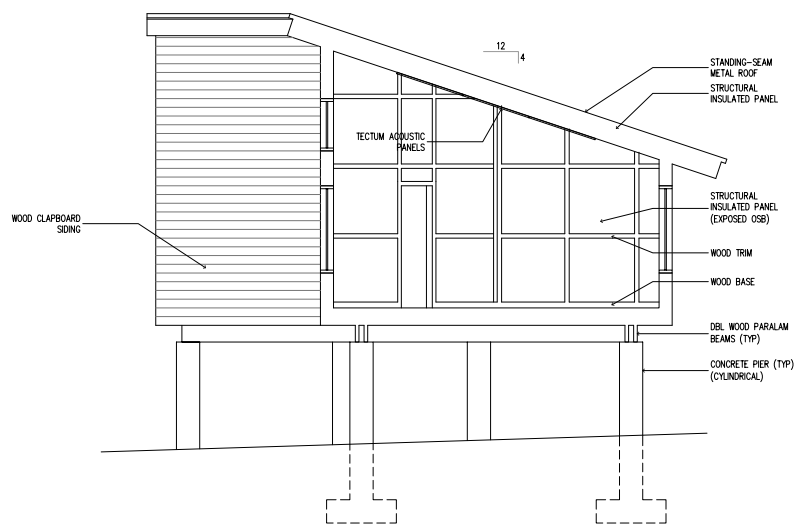


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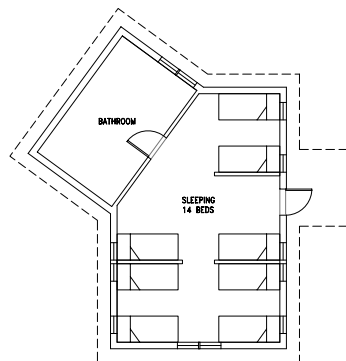
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'Grass' Building

Sheet No:
A-2-G

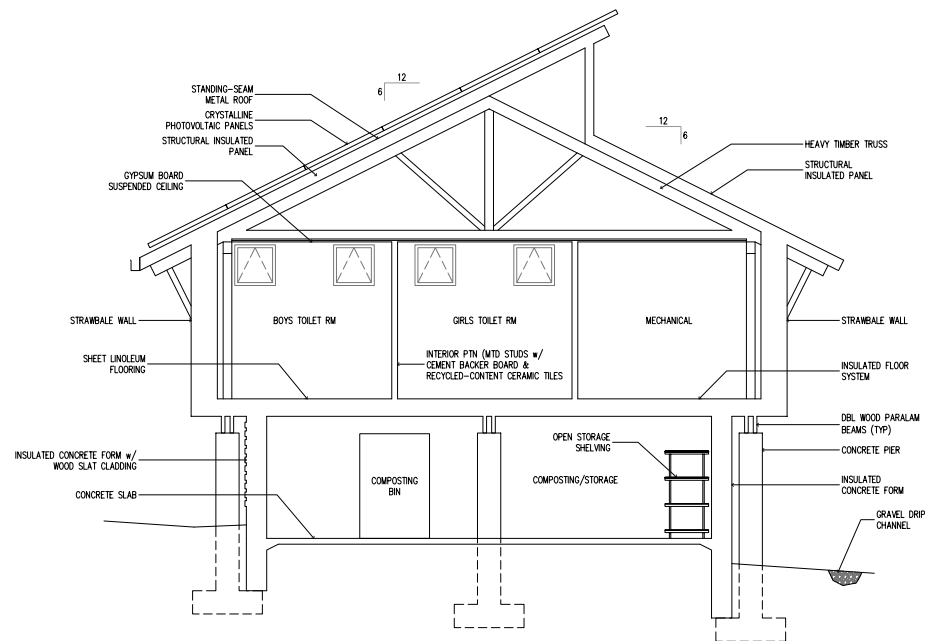
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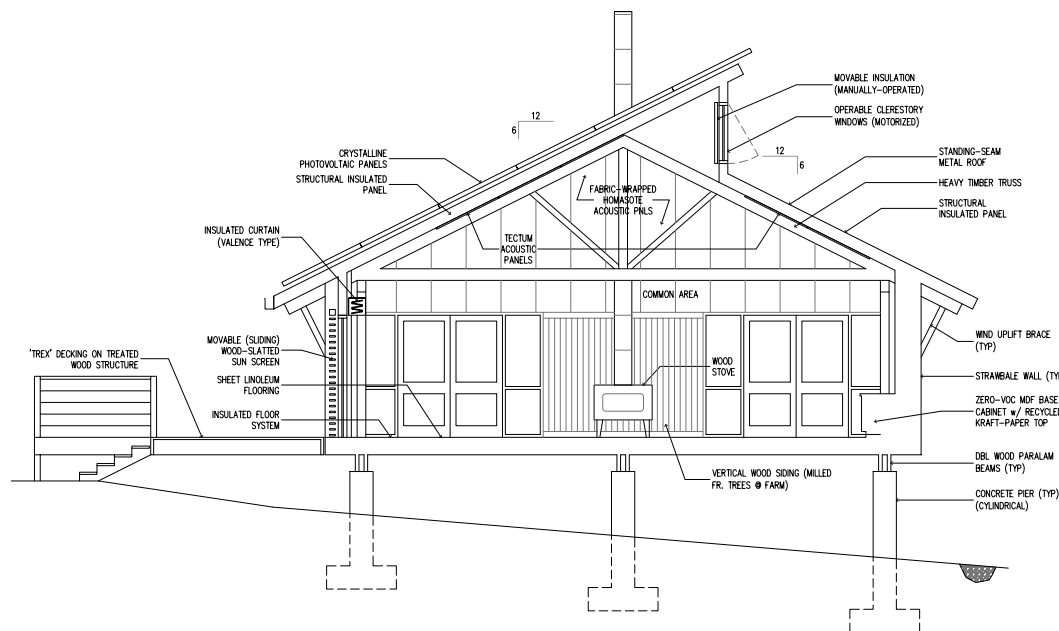
TRANVERSE SECTION THRU TYP SLEEPING CABIN
SCALE = 1/4" = 1'-0"



FLOOR PLAN - SLEEPING CABIN (TYP OF 2)
SCALE = 1/8" = 1'-0"



TRANVERSE SECTION THRU TOILET/STORAGE WING
SCALE = 1/4" = 1'-0"



TRANVERSE SECTION THRU MAIN SPACE
SCALE = 1/4" = 1'-0"



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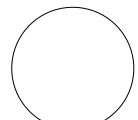
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SCHEMATIC PRICING SET

Revision:
Date: 14 MARCH 2008
Scale: AS NOTED
Title: Building Sections
'Grass' Building

Sheet No:

A-3-G

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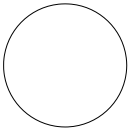
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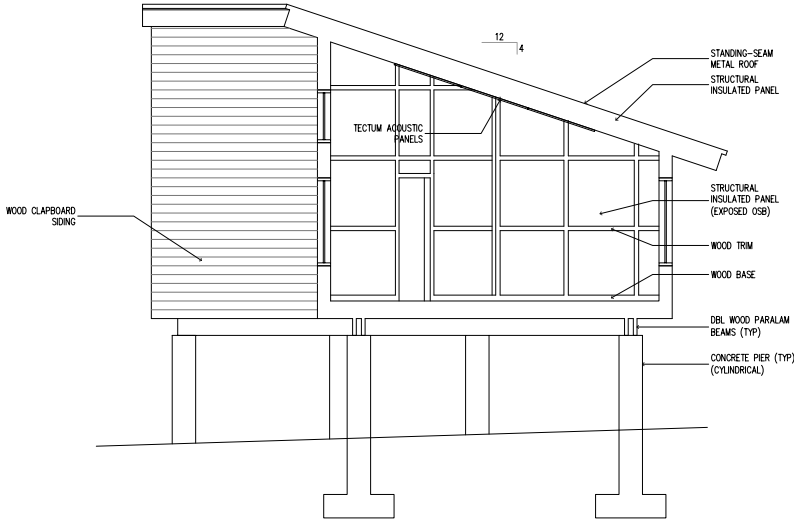


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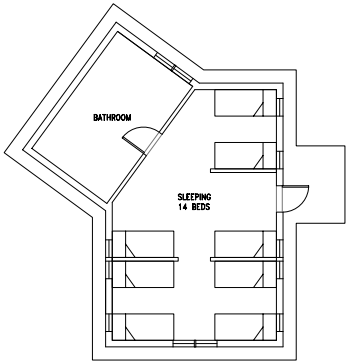
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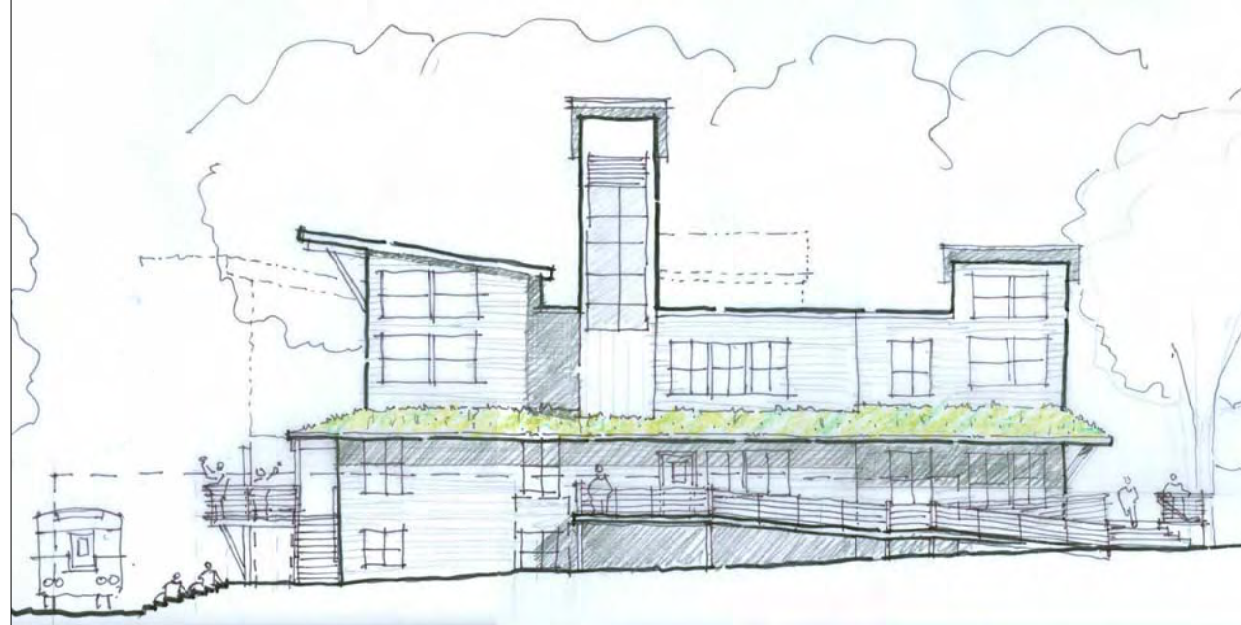
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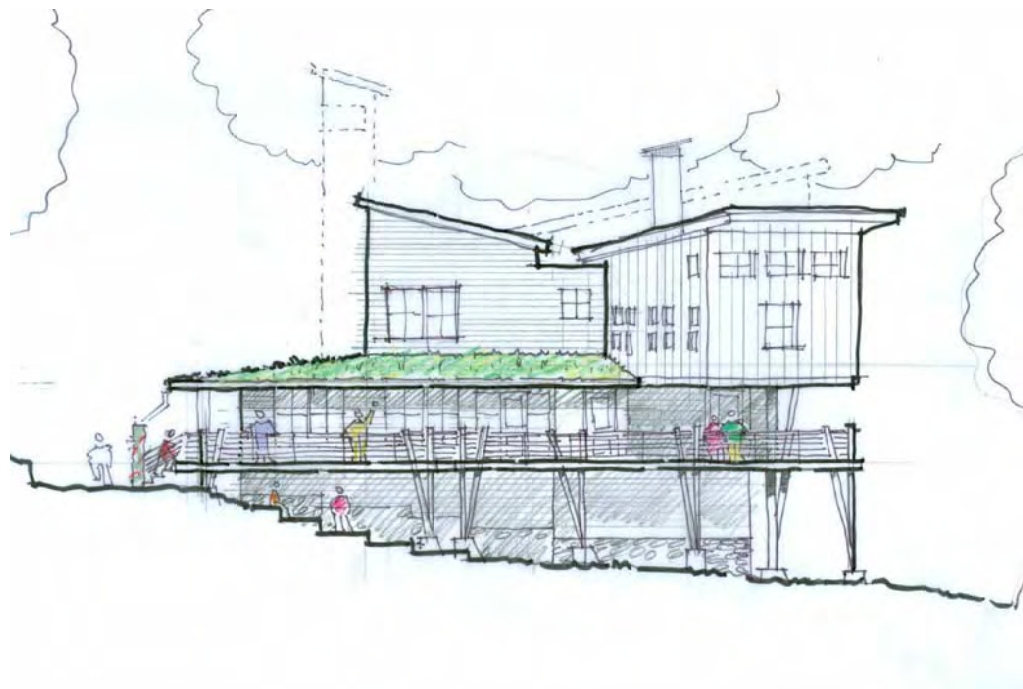
FLOOR PLAN (TYP OF 2 SLEEPING CABINS)
SCALE = 1/8" = 1'-0"



WEST ELEVATION
SCALE = 1/8" = 1'-0"



SOUTH ELEVATION
SCALE = 1/8" = 1'-0"



EAST ELEVATION
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NORTH ELEVATION
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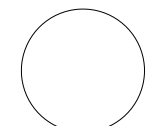
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Cabins



STATUS LINE
SCHEMATIC DESIGN SET

Revision:
Date: 14 MARCH 2007
Scale: AS NOTED
Title: Exterior Elevations
'Moss' Building

Sheet No:
A-2-M

The Location:
Contractor to verify all dimensions in field and
inform Architect of any discrepancies before
starting work.



POTOMAC RIVER
HABITAT STUDY COMPLEX
ALICE FERGUSON FOUNDATION
201 Bryan Pointe Road
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RE: VISION ARCHITECTURE
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3215 Leonardtown Road
Waldorf, MD 20602
Phone: 301 638 4401
Fax: 301 638 4403

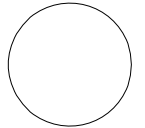
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AKF Engineers, LLP
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Wayne, PA 19087
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Construction Manager
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4401 4th South Street
Arlington, VA 22204
Phone: 703 822 4089
Fax: 703 822 4090

DRAWING LIST	
L-1	Site Layout - Overall
L-2	Planting Plan
L-3	Planting Plan w/ Schedule
L-4	Planting Details

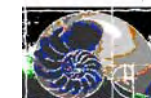


STATUS LINE
SPECIAL EXCEPTION SITE PLAN

Revision:
Date: SEPTEMBER 2008
Scale: 1"=50'
Title: OVERALL SITE PLAN

Sheet No:
L-1

The Locales
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DRAWING LIST	
L-1	Site Layout - Overall
L-2	Planting Plan
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L-4	Planting Details

File Locality:
Contractor to verify all dimensions in field and inform Architect of any discrepancies before starting work.



PLANT SCHEDULE

Key	Quantity	Botanical Name	Common Name	Size	Root	Remarks
Canopy Trees 88 TOTAL TREES						
AR-1	1	Acer rubrum	Red Maple	14-16' Height	B & B	
AR-2	4	Acer rubrum	Red Maple	8-9.5' cal	B & B	clump-form, 3 stems min.
AS	4	Acer saccharum	Sugar Maple	8-9.5' cal	B & B	
BL	6	Betula lenta	Sweet Birch	14-16' Height	B & B	multi-stem, 3 stems min.
CO	3	Carya ovata	Shagbark Hickory	8-9.5' cal	B & B	
FA	4	Fraxinus americana	White Ash	8-9.5' cal	B & B	
FG	6	Fagus grandifolia	American Beech	2-2.5' cal	B & B	
LT	5	Liriodendron tulipifera	Tulip Poplar	8-9.5' cal	B & B	
NS	3	Nyssa sylvatica	Black Gum	2-2.5' cal	B & B	
PO	1	Platanus occidentalis	Sycamore	8-9.5' cal	B & B	
PO-2	2	Platanus occidentalis	Sycamore	2-2.5' cal	B & B	
QP	5	Quercus prinus	Chestnut Oak	8-9.5' cal	B & B	
QR	2	Quercus rubra	Red Oak	8-9.5' cal	B & B	

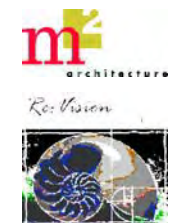
Understory Trees/Sub-Canopy 63 TOTAL TREES						
AA	8	Amelanchier arborea	Shadblow	8-10' Height	B & B/Container	multi-stem, 3 stems min.
CC	4	Cercis canadensis	Eastern Redbud	8-10' Height	B & B	multi-stem, 3 stems min.
CC-2	4	Corpus caroliniana	American Hornbeam	8-10' Height	B & B	multi-stem, 3 stems min.
CF	4	Cornus florida	Flowering Dogwood	1.25-1.5' cal	B & B	
CV	1	Chionanthus virginicus	Fringetree	8-10' Height	B & B/Container	multi-stem, 3 stems min.
HV	4	Hamelia virginiana	Common Nitchazel	8-10' Height	B & B/Container	multi-stem, 3 stems min.
OV	5	Ostrya virginiana	Eastern Hophornbeam	8-10' Height	B & B	multi-stem, 3 stems min.
SA	4	Sassafras albidum	Sassafras	8-10' Height	B & B	multi-stem, 3 stems min.

Evergreen Trees 13 TOTAL TREES						
IO	3	Ilex opaca	American Holly	8-10' Height	B & B	
JV	1	Juniperus virginiana	Eastern Redcedar	8-10' Height	B & B	
PS	5	Pinus strobus	White Pine	8-10' Height	B & B	

Shrubs 150 TOTAL SHRUBS						
AA-2	15	Amelanchier arborea	Red Chokeberry	24-36" Height	B & B/Container	
IV	12	Ilex verticillata	Winterberry	24-36" Height	B & B	male pollinator needed.
IV-2	15	Itea virginica	Viniera Sweet Spire	24-36" Height	B & B	
LB	1	Lindera benzoin	Spicebush	24-36" Height	B & B	
RC	8	Rhododendron canadense	Piedmont Azalea	24-36" Height	B & B	
RG	14	Rhododendron periclymenoides	Pinxter Azalea	24-36" Height	B & B	
VP	4	Viburnum cassinoides	Withered Viburnum	36-48" Height	B & B/Container	
VP	1	Viburnum dentatum	Arrowwood Viburnum	24-36" Height	B & B	
VN	1	Viburnum nudum 'Winterthur'	Winterthur Viburnum	24-36" Height	B & B	
VN-2	3	Viburnum nudum 'Cavat' Polaski'	Winterthur Viburnum	24-36" Height	B & B	
VP	1	Viburnum prunifolium	Blackhaw Viburnum	36-48" Height	B & B/Container	

Fast Growing Successional Trees (Seedlings) 250 TOTAL TREES						
25	Acer saccharum	Sugar Maple	24' Height	#1 Container		60" o.c. plant in irregular groups of 3-5 for each species
50	Betula lenta	Sweet Birch				
50	Liriodendron tulipifera	Tulip Poplar				
25	Quercus alba	White Oak				
25	Quercus prinus	Chestnut Oak				
75	Sassafras albidum	Sassafras				

Perennials/Herbaceous						
P1	650	Rain Garden - Channel Planting	6" spacing	#5PS	plug	
	17%	Juncus effusus	Soft Rush	#5PS	plug	
	17%	Scirpus americanus	Common Threesquare	#5PS	plug	
	33%	Scirpus validus	Saltstem Bulrush	#5PS	plug	
	33%	Typha latifolia	Broad-leaved Cattail	#5PS	plug	
P2	5435	Rain Garden - Channel Planting	6" spacing	#5PS	plug	
	20%	Equisetum hyemale	Horseshoe	#5PS	plug	
	30%	Eleocharis aquatilis	Knotted spike rush	#5PS	plug	
	20%	Juncus effusus	Soft Rush	#5PS	plug	
	30%	Onoclea sensibilis	Sensitive Fern	#5PS	plug	
P3	710	Rain Garden - Wet Meadow Planting	8" spacing	#5PS	plug	
	20%	Asclepias incarnata	Red Milkweed	#5PS	plug	
	25%	Chelonea lyoni	Pink Turtlehead	#5PS	plug	
	30%	Iris versicolor	Blue Flag Iris	#5PS	plug	
	25%	Onoclea sensibilis	Sensitive Fern	#5PS	plug	
P4	5655	Scale Planting	8" spacing	#5PS	plug	
	60%	Chelonea lyoni	Pink Turtlehead	#5PS	plug	
	40%	Onoclea sensibilis	Sensitive Fern	#5PS	plug	
P5 (500 SQ. FT.)	100%	Rain Garden - Upland Sun Mix	1/2 lbs/1000 SQ. FT.			
	100%	TERNMX-180 seed mix as specified by Ernst Conservation Seeds, Meadville, PA				
P6 (50 ACRES)	100%	Low Maintenance Lawn Seed Mix	215 lbs/acre			
	100%	"No Mow" seed mix as specified by Prairie Nursery, Westfield, PA				
P7 (26 ACRES)	100%	Native Meadow Seed Mix	15 lbs/acre			
	100%	TERNMX-105 seed mix as specified by Ernst Conservation Seeds, Meadville, PA				



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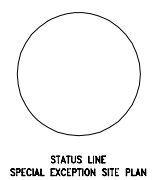
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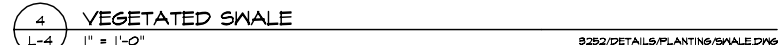
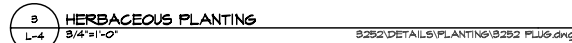
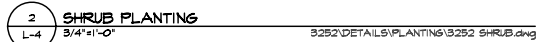
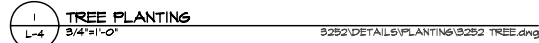
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L-2	Planting Plan
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Revision:
Date: SEPTEMBER 2008
Scale: 1"=20'
Title: Planting Plan

Sheet No:
L-3

File Location:
Contractor to verify all dimensions in field and inform Architect of any discrepancies before starting work.



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SITE PLAN FOR
POTOMAC RIVER HABITAT STUDY COMPLEX

HARD BARGAIN FARM

11th ELECTION DISTRICT
PRINCE GEORGE'S COUNTY, MARYLAND

SHEET INDEX

SHEET NO.	DESCRIPTION
1 of 3	COVER & APPROVAL SHEET
2 of 3	SITE LAYOUT PLAN
3 of 3	DETAIL SHEET

L1	OVERALL SITE PLAN
L2	PLANTING PLAN
L3	PLANTING PLAN
L4	PLANTING DETAILS

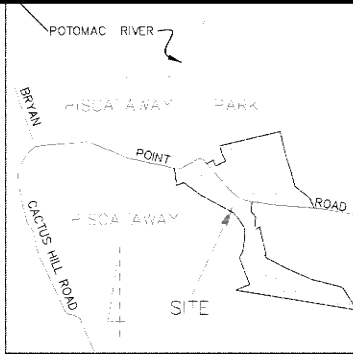
FOR LOCATION OF UTILITIES CALL 1-800-257-7777
48 HOURS IN ADVANCE OF ANY WORK IN THE VICINITY

OWNER/APPLICANT:

ALICE FERGUSON FOUNDATION
2001 BRYAN POINT ROAD
ACCOKEEK, MD 20616
301-292-5665

ENGINEER:

CROUSE ENGINEERING, INC.
3215 LEONARDTOWN ROAD
WALDORF, MD 20601
301-638-4401



PG. CO. GRID NO. 29F13
PG. CO. GRID NO. 29G13
WSSC 200' SHEET NO. 2195W02

SCALE: 1"=2000'

ALICE FERGUSON FOUNDATION
2001 BRYAN POINT ROAD
ACCOKEEK, MD 20616
301-292-5665

DATE: MAY 2008-MEO
PROJECT: MAY 2008-MEO
CADD FILE: 2007102

SCHEDULE FOR SECTION 4.2

COMMERCIAL AND INDUSTRIAL LANDSCAPED STRIP

- 1) LINEAR FEET OF STREET FRONTAGE NOT INCLUDING PARKING LOTS AND DRIVEWAY ENTRANCES: 185 FEET
- 2) OPTION SELECTED (1, 2, 3, 4, OR 5): OPTION 1
- 3) NUMBER OF PLANTS REQUIRED: 5 SHADE TREES
53 SHRUBS
- 4) NUMBER OF PLANTS PROVIDED: 5 SHADE TREES
55 SHRUBS

SCHEDULE FOR SECTION 4.3.b

PERIMETER AREA

- 1) LINEAR FEET OF PARKING LOT PERIMETER ADJACENT TO PROPERTY LINE: N/A
- 2) NUMBER OF PLANTS REQUIRED BETWEEN PARKING LOT AND PROPERTY LINE:
0 SHADE TREES (OR EQUIVALENT
ORNAMENTAL OR EVERGREEN TREES)
0 SHRUBS
- 3) NUMBER OF PLANTS PROVIDED BETWEEN PARKING LOT AND PROPERTY LINE:
0 SHADE TREES
0 ORNAMENTAL TREES
0 EVERGREEN TREES
0 SHRUBS

SECT. 4.6

STREET BUFFER (1.5 x NUMBER TREES;

- 0 SHADES
- 0 EVERGREENS
- 0 SHRUBS

N/A

SCHEDULE FOR SECTION 4.7.

BUFFER YARD PLANTING

- 1) USE CATEGORY OF PROPOSED (NON-RESIDENTIAL) DEVELOPMENT: WILDLIFE HABITAT STUDY COMPLEX
- 2) IMPACT OF PROPOSED DEVELOPMENT (I, M, OR U): M
- 3) USE CATEGORY OF ADJOINING DEVELOPMENT: RCO, ROS
- 4) IMPACT OF ADJOINING DEVELOPMENT (I, M, U): NONE
- 5) MINIMUM REQUIRED BUFFER YARD (A, B, C, OR D): NONE
- 6) MINIMUM BUILDING SETBACK: N/A
- 7) MINIMUM WIDTH OF LANDSCAPED YARD: N/A
- LINEAR FEET OF BUFFER STRIP REQUIRED ALONG PROPERTY LINE AND RIGHT-OF-WAY: N/A
- 8) PERCENTAGE OF REQUIRED BUFFER YARD OCCUPIED BY EXISTING WOODLAND: 0
- 9) SIX-FOOT FENCE OR WALL OR FIVE FOOT BERM EMPLOYED IN BUFFER YARD: NO
- 10) TOTAL NUMBER OF PLANT UNITS REQUIRED IN BUFFER STRIP: N/A
- 11) NUMBER OF SHADE TREES PROVIDED: N/A
- NUMBER OF EVERGREEN TREES: N/A
- NUMBER OF ORNAMENTAL TREES: N/A
- NUMBER OF SHRUBS: N/A
- 12) TOTAL NUMBER OF PLANT UNITS PROVIDED IN BUFFER STRIP: N/A

GENERAL NOTES

1. The development proposal is for the construction of a 13,000 square foot Lodge building, 4,000 square foot single story pavilion building, 2 - 750 square foot sleeping cabins and an elevated boardwalk and wildlife viewing platforms across an emergent wetlands.
2. The property is currently zoned O-S. The proposed Lodge building is a permitted use in the O-S zone per Table 27-441(b) of the current Prince George's County Zoning Code. A detailed site plan is required for this use per Section 27-475.06.01.(a)(2) of the current Prince George's County Zoning Code.
3. Contractor is responsible for contacting "Miss Utility" at 1-800-257-7777 48 hours in advance of any work in this vicinity.
4. Certificate of Compliance -- This plan conforms to Subtitle 4 of the Building Code Division 3 of Prince George's County, Maryland.
5. Maximum slopes shall be not greater than three (3) feet horizontal to one (1) foot vertical. Slopes within the road right-of-way shall be not greater than two (2) feet horizontal to one (1) foot vertical.
6. Certified compaction tests are required for all trench/fill work on site. Earth work shall be placed and compacted to a point at least (3) feet above the top of the water, sewer, and storm drain lines. Final reports and certifications shall be provided prior to release of bonds.
7. Existing utilities and obstructions shown are from the best available records and shall be verified by the contractor to his satisfaction prior to construction.
8. The site is served by public water and sewer systems and shall comply with the latest standards and specifications of WSSC.
9. Total site area: 120.05 Acres
10. Flood Plain Area: 20.72 Acres
11. Net Lot Area: 14.15 Acres
12. Disturbed Area: 9.60 Acres
13. Boundary and topography shown hereon was prepared by Capital Development Design Inc. # M-NCPPC
14. Stormwater management is provided in the proposed facility located on site.
15. Proposed new building height = 21 feet.
16. Proposed new building coverage: 18,500 s.f.
17. Proposed Floor Area Ratio = 0.03 (0.30 max)
18. Parking required = 25 spaces (23 regular + 2 handicapped)
19. Parking provided = 25 spaces total
20. Parking lot is to be surface with a durable, dust-free, all-weather surface. Parking spaces shall be marked with durable, contrasting painted lines.
21. Green area required: 25% of net lot area = 25% * 15.23 Acres = 3.81 Acres (165,855 square feet)
22. Green area provided:
23. Existing utilities and obstructions shown are from the best available records and shall be verified by the contractor.

ENGINEER'S CERTIFICATION

I hereby certify that I have inspected this site and that drainage onto this site from upgrage properties and from this site onto downgrage properties has been addressed in substantial conformance with applicable codes.

I hereby certify that this site plan conforms to the requirements of subtitle 4, Division 3 of the Prince George's County, Maryland Building Code, except for specific modifications and/or waivers as listed below

KEN R. CROUSE, P.E.
MD Registration No. 25368

CERTIFICATES OF APPROVAL

Parking Schedule

Day Use Education Pavilion (Community Building-Eating or Drinking Establishment)
one (1) space for every three (3) seats
total seating = 30 seats
parking required = 10 spaces
TOTAL REQUIRED = 10 SPACES

Wildlife Habitat Training Facility - 14,334 sq. ft. of building
one (1) space for every 1,000 sq. ft. Gross Floor Area
parking required = 15 spaces

TOTAL REQUIRED = 25 SPACES (23 REGULAR AND 2 HANDICAP)
BASED ON TOTAL OF 25 NEW SPACES 1 MUST BE HANDICAP
TOTAL PROVIDED = 23 REGULAR SPACES + 2 HANDICAP

Engineer's Certification

I hereby certify that the plans shown hereon are correct and conform to the standards and specification of the St. Mary's County road, grading and sediment control and stormwater management ordinance, these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No.: 25368 Expiration Date: 7/14/2010

Ken R. Crouse, P.E. #25368



Date

SCALE: NONE

SHEET

1
OF 3

FILE 2007102

HARD BARGAIN FARM

11TH ELECTION DISTRICT, PRINCE GEORGE'S COUNTY, MARYLAND

COVER & APPROVAL SHEET

CROUSE ENGINEERING, INC.
3215 LEONARDTOWN ROAD
WALDORF, MARYLAND 20602
301-638-4401
301-638-4403



C:\Land Projects\2008\2007102\dwg\ACAD-MB-00.dwg 3/26/2008 10:49:20 AM EDT

LEGEND:

- | | | |
|----------------------|--------------------------------|-------------------|
| PERK POWER POLE | VOICE-ACTUATOR | PROPERTY LINE |
| WAMP POST | WOOD FENCE | WETLAND BUFFER |
| CUTLINE | EDGE OF DRIVE/ROADWAY/PAVEMENT | CROWN BUTTE |
| BOX | GRADE WALK/BRIDGE | STREAK BANK |
| POST TEST BUMP ASSED | TOP OF BANK | 50' STREAM BUFFER |
| GATE | BOTTOM OF BANK | WETLAND |
| MAIL BOX | CONCRETE GRADE | CONCRETE PAVEMENT |
| | STAKE | 50' SIDE |
| | RETAINING WALL | WOODLINE |

FOR LOCATION OF UTILITIES CALL 1-800-257-7777
48 HOURS IN ADVANCE OF ANY WORK IN THE VICINITY

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I hereby certify that the plans shown hereon are correct and conform to the standards and specification of the St. Mary's County road, grading and sediment control, and stormwater management ordinance, these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No.: 25368 Expiration Date: 7/14/2010

WSSC 200' SHEET NO. 2195W02
PG. CO. GRID NO. 29F13
PG. CO. GRID NO. 29G13



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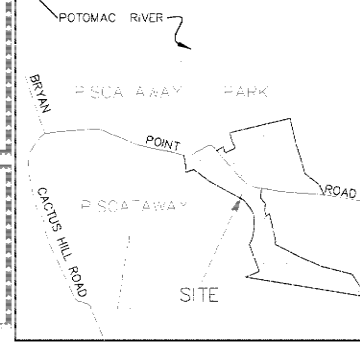
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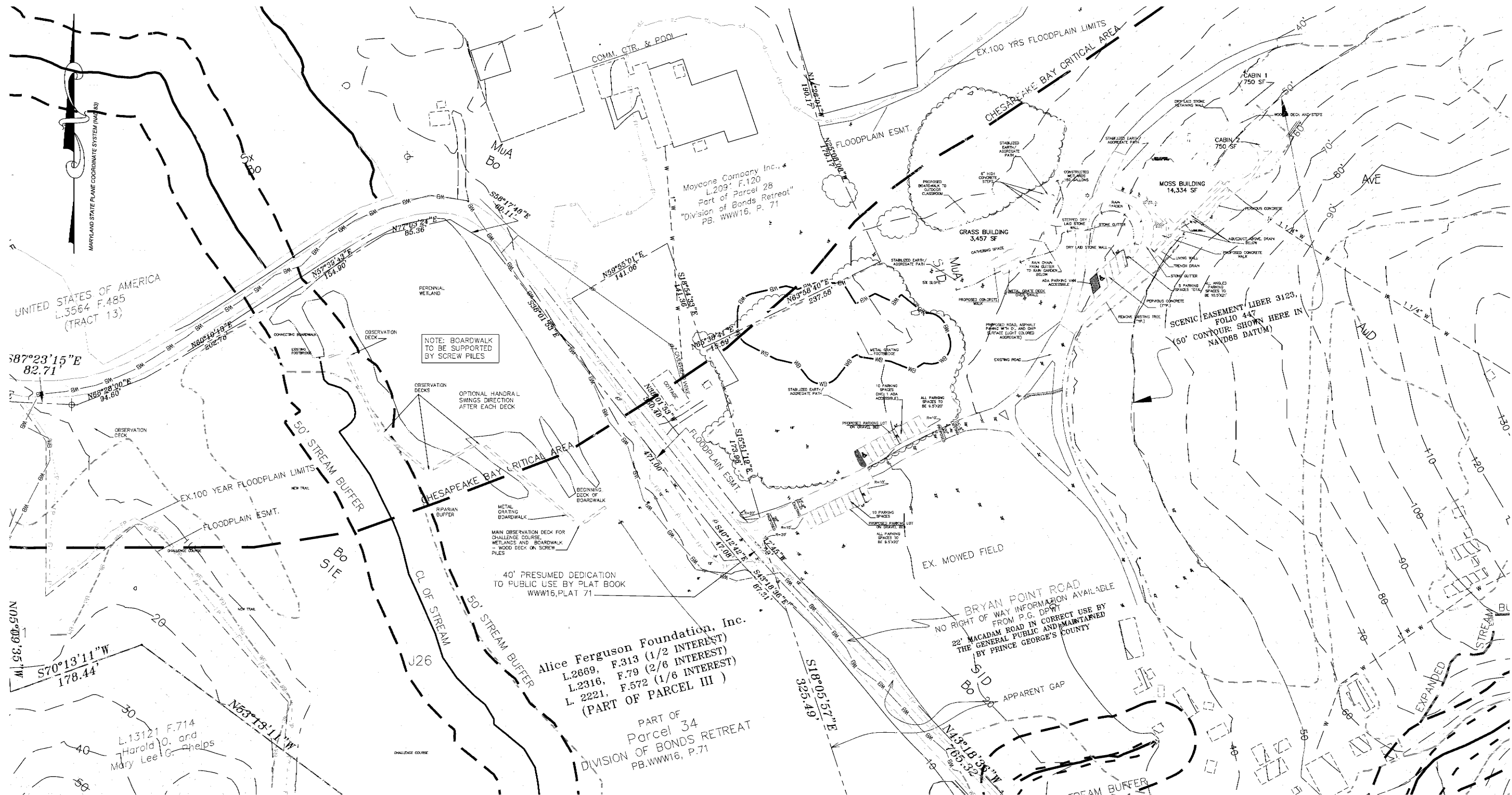
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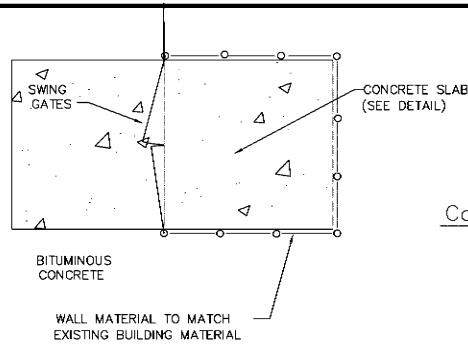
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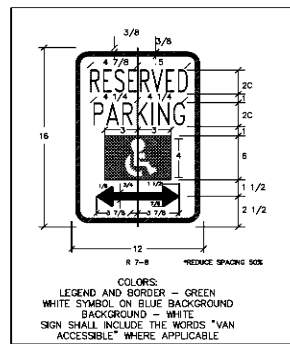
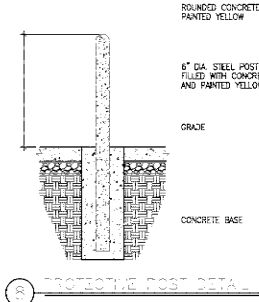
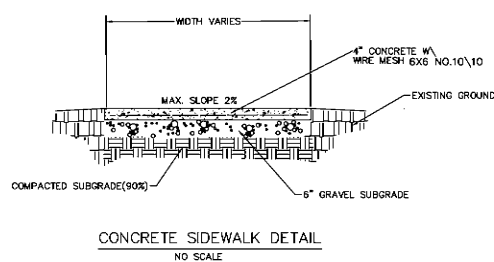
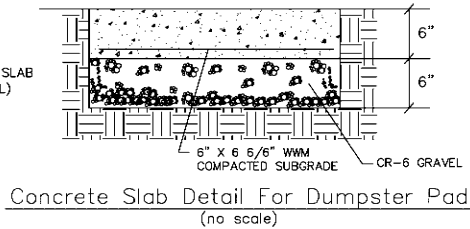
Revisions	Description	Date

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HARD BARGAIN FARM
11TH ELECTION DISTRICT, PRINCE GEORGE'S COUNTY, MARYLAND
SITE LAYOUT PLAN



DUMPSTER ENCLOSURE
NO SCALE

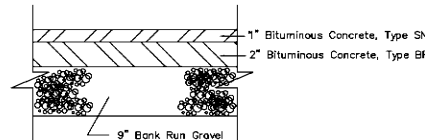


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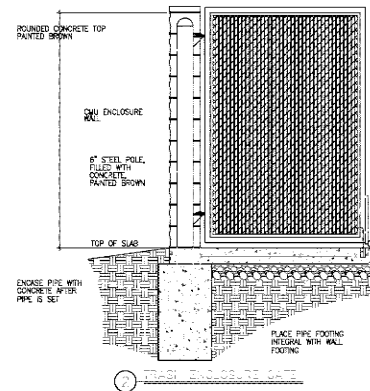
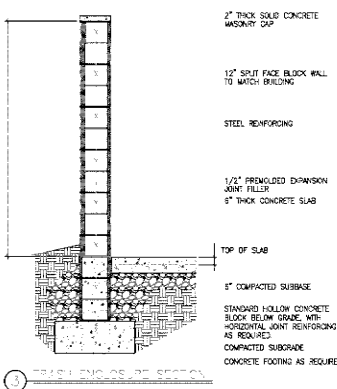
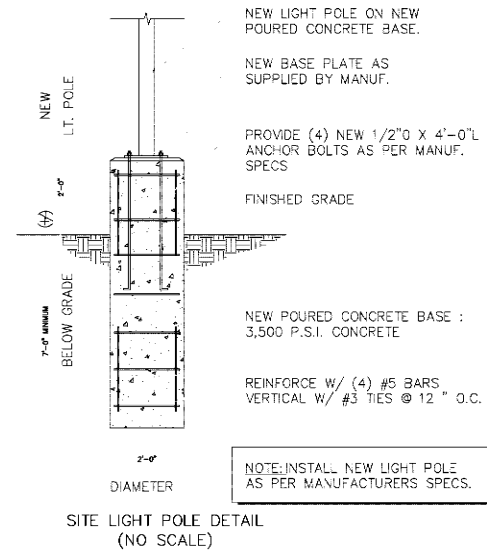
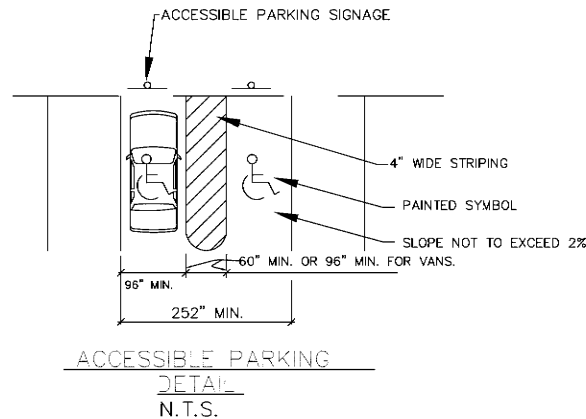
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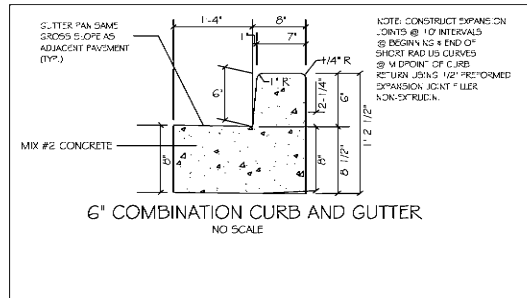
WSSC 200' SHEET NO. 2195W02 PG. CO. GRID NO. 29F13
PG. CO. GRID NO. 29G13



P-1 Pavement Detail (Site Paving)
(no scale)



COMMERCIAL GRADE GALVANIZED
CHAIN LINK FENCE W/ VERTICAL
INFILL SLATS & BROWN VINYL
COATING
BRONZE COMMERCIAL GRADE
BRASS TOP AND LOCKING
HARDWARE
TYPE CLAMPS SECURED
SPACES TO FACILITATE
SLIDING
CONCRETE GRADE LINES
W/ IRON PIPES FOR EACH DATE
PIPE SLEEVES SET IN
CONCRETE TO REDUCE
BURN OUT. STOP 12"
LONG. BOLT 1/4"
ABOVE CONCRETE



Engineer's Certification
I hereby certify that the plans shown hereon are correct and conform to the standards and specification of the St. Mary's County road, grading and sediment control, and stormwater management ordinance, these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No.: 25368 Expiration Date: 7/14/2010

Ken R. Crouse, P.E. #23568 Date



ALICE FERGUSON FOUNDATION
2001 BRYAN POINT ROAD
ACCOKEEK, MD 20616
301-292-5665

CROUSE ENGINEERING, INC.
3215 LEONARDTOWN ROAD
WALDORF, MARYLAND 20602
301-638-4401
301-638-4403

HARD BARGAIN FARM
11TH ELECTION DISTRICT, PRINCE GEORGES COUNTY, MARYLAND

DETAILS SHEET

SCALE: AS SHOWN

SHEET 3 OF 3
FILE 2007102

DATE: 2007102
PROJECT FILE: 2007102

Schematic Design Phase - Structural Systems
October 20, 2008

MOSS BUILDING

SIPS Roof Panels: (structural Insulated Panels) made from expanded polystyrene and OSB sheathing

7-3/4" thick (7.25" core) SIP panels with I-Joist splines at 4 feet o.c. can span 18 feet.

9-3/4" thick (9.25" core) SIP panels with I-Joist splines at 4 feet o.c. can span 20 feet.

Roof Framing: Manufactured Lumber Beams to support long span SIPS panels.

Exterior bearing and shear walls: 2x6 lumber frame with plywood sheathing, and insulation between studs.

Upper and Main floor framing:

Open Web series manufactured joists, spaced @ 24" o.c., spanning 22 feet. Approximately 18" deep at classrooms and dorms, and 24" deep at assembly and hallways. 3/4" plywood/OSB floor sheathing rated 30/24. Floor systems shall bear on interior stud bearing walls, and/or exposed Glulam timber girders and posts.

Timber Frame with steel plate connections at large central common area:

Glued-laminated timber roof trusses, roof beams, posts with knee braces, spandrels and girders.

Tree columns to support sleeping pods:

Single vertical timber pole with several canted poles, at least one canted pole needs to reach the base of the vertical pole.

Foundations:

Concrete Masonry Unit, or Insulated Concrete Form foundation walls, on spread footings located a minimum of 3 feet below grade. 4" concrete slab on grade. Sloped site will require some cut and fill of soils, and compaction.

Timber or steel posts on concrete pier, on isolated footings. Investigate reusable form options for concrete piers.

Ground water is approximately 6 feet below grade.

Masonry Fireplace hearth and Foundation

GRASS BUILDING

Roof System: Gable Roof Trusses, with clerestory strip dormer, spanning 32 feet, option a: lumber trusses spaced at 24" o.c. with plywood sheathing and ___?___ insulation.

option b: timber trusses spaced at 4 feet o.c., or 8 feet o.c. with SIPS roof panels.

SIPS Roof Panels: 8" thick (7.375" core) SIP panels with double OSB splines can span 8 feet.

Trusses at Common Area and Breezeway will be architecturally exposed.

Wall System: 2x6 frame wall with plywood sheathing, and insulation between studs.

Floor System: Main floor framing may be Open Web series manufactured joists spaced @ 16" o.c., spanning 16 feet between exterior line of girders and center girder and foundations. 3/4" OSB floor sheathing.

Foundations:

Concrete Masonry Unit, or Insulated Concrete Form foundation walls, on spread footings located a minimum of 3 feet below grade.

Timber posts on concrete pier, on isolated footings. Investigate reusable form options for concrete piers.

Ground water is approximately 3 feet below grade.

Masonry Fireplace hearth and Foundation

FRAMING MATERIALS

- Salvaged lumber, timbers, and decking. Preferred recommendation of Living Building Challenge.
- Forest Stewardship Council (FSC) lumber, timbers, plywood, decking. **Formaldehyde Free***. Several certified suppliers listed in Virginia.
- * Adhesives in manufactured lumber products: phenol & formaldehyde chemically bonded to form phenolic polymer resin. The American Plywood Association claims that the polymer contains less than 1/10th of 1 percent of unbonded (free) formaldehyde, at the time of manufacture. APA rated PS1 and PS2 panel products ensure that free formaldehyde is within these limits.
- Specify low VOC adhesives for use on site.
- Steel with high recycled content

FRAMING TECHNIQUES

- Reduce material waste with Factory built, panelized, pre-assembled framing where practical.

FRAMING OPTIONS FOR SHORT SPANS 12 TO 14 FEET:

- 2x 10 lumber joists and rafters
- Timber girders

FRAMING OPTIONS FOR SPANS EXCEEDING 16 FEET

- Pre-manufactured plywood web I-Joists
- Pre-manufactured open steel web I-Joists
- Glued laminated and glued manufactured lumber beams
- Steel beams and columns

ESTIMATE OF SALVAGEABLE FRAMING AT EXISTING LODGE BUILDING:

2x10 floor joists & rafters

- 11 feet lengths – 90 pieces
- 8 feet lengths – 60 pieces
- 24 feet lengths – 22 pieces

2x6 top and bottom chords

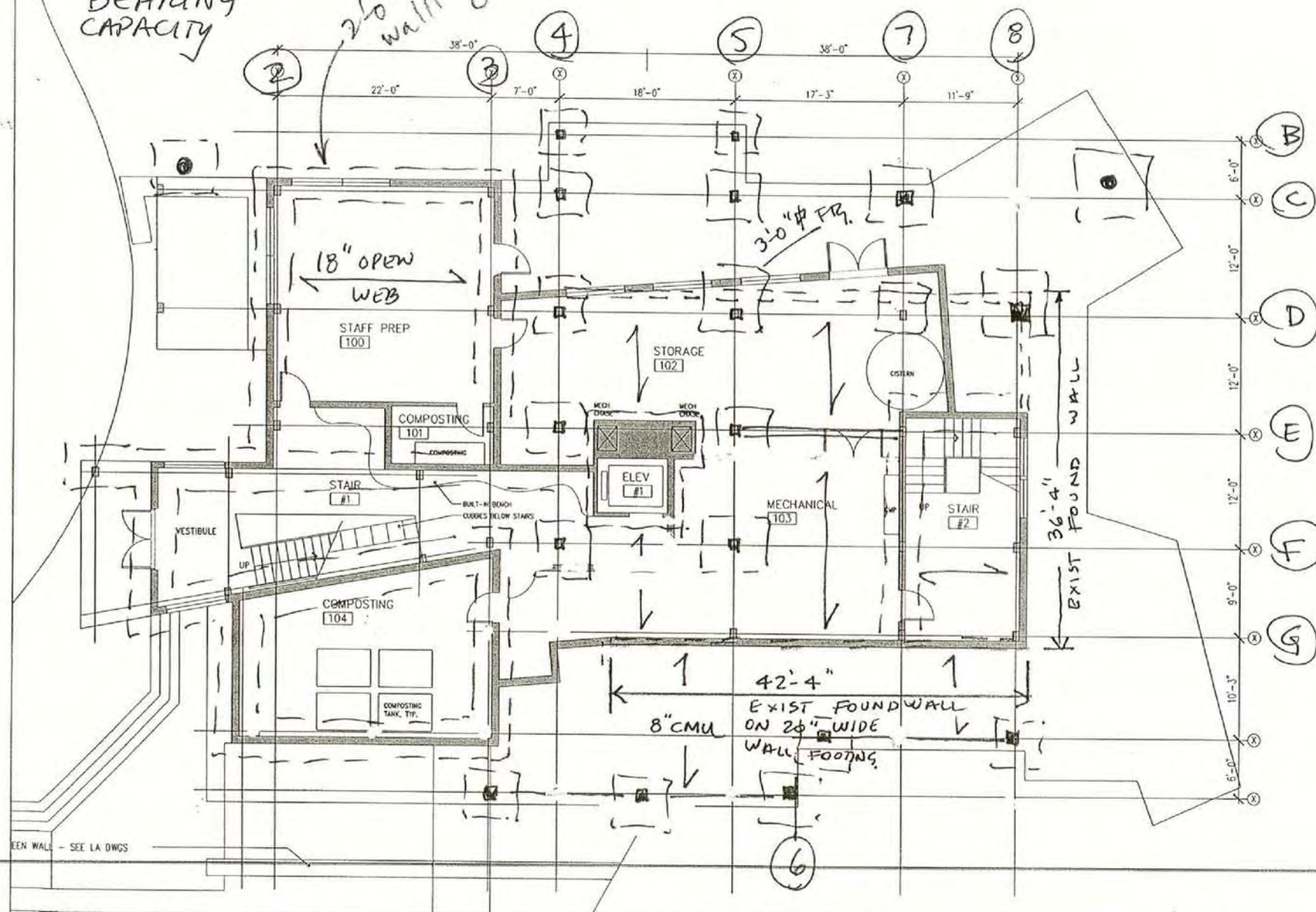
- 22 feet lengths – 40 pieces
- 10 feet lengths – 80 pieces

2x4 studs

- 8 feet length – 150 pieces.

ASSUME
3000 PSF
BEARING
CAPACITY

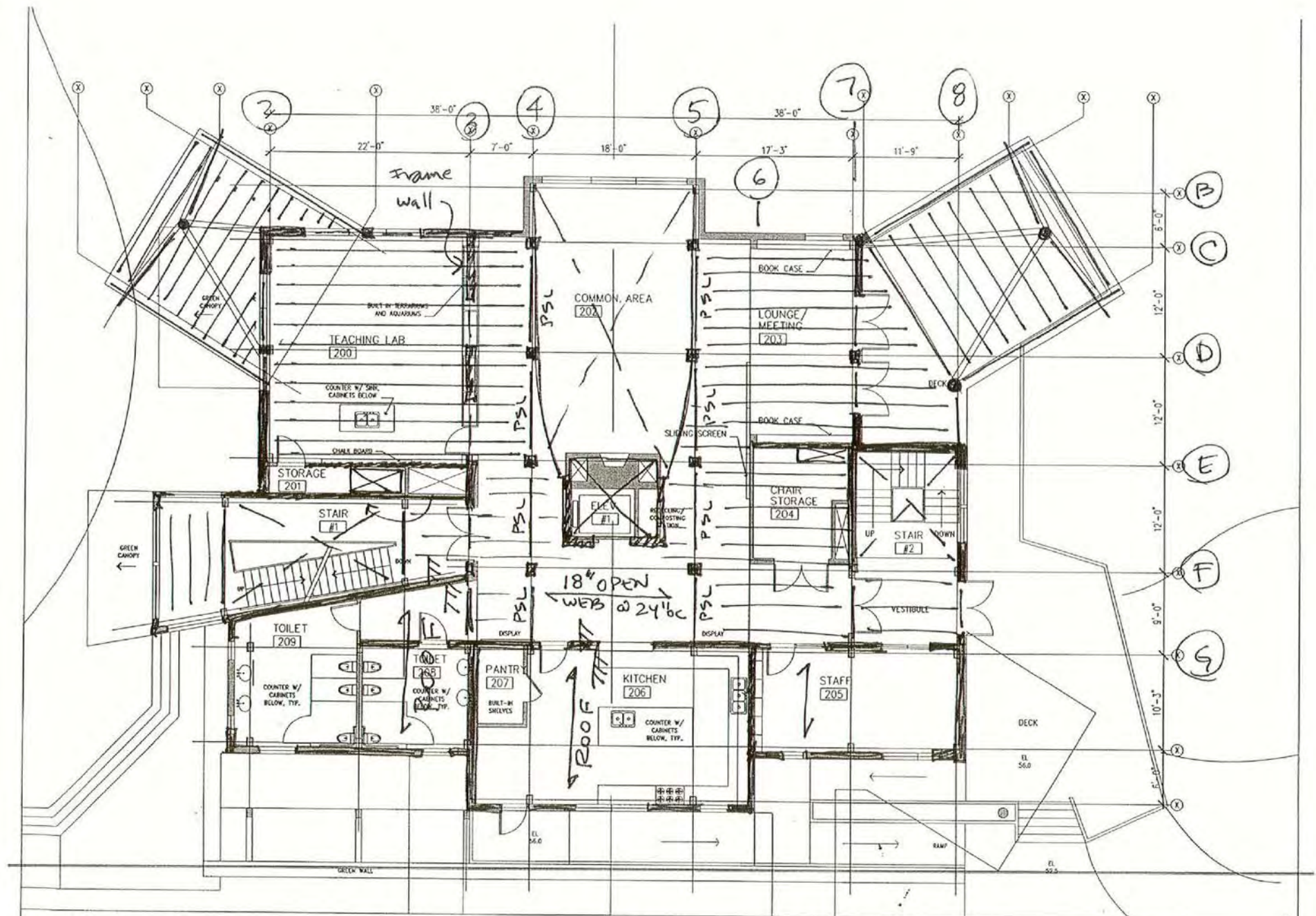
2'-0" WALL TAG.



LOWER LEVEL PLAN
SCALE = 1/8" = 1'-0"
3-12-07 Plans

MAIN FLOOR FRAMING & FOUNDATIONS

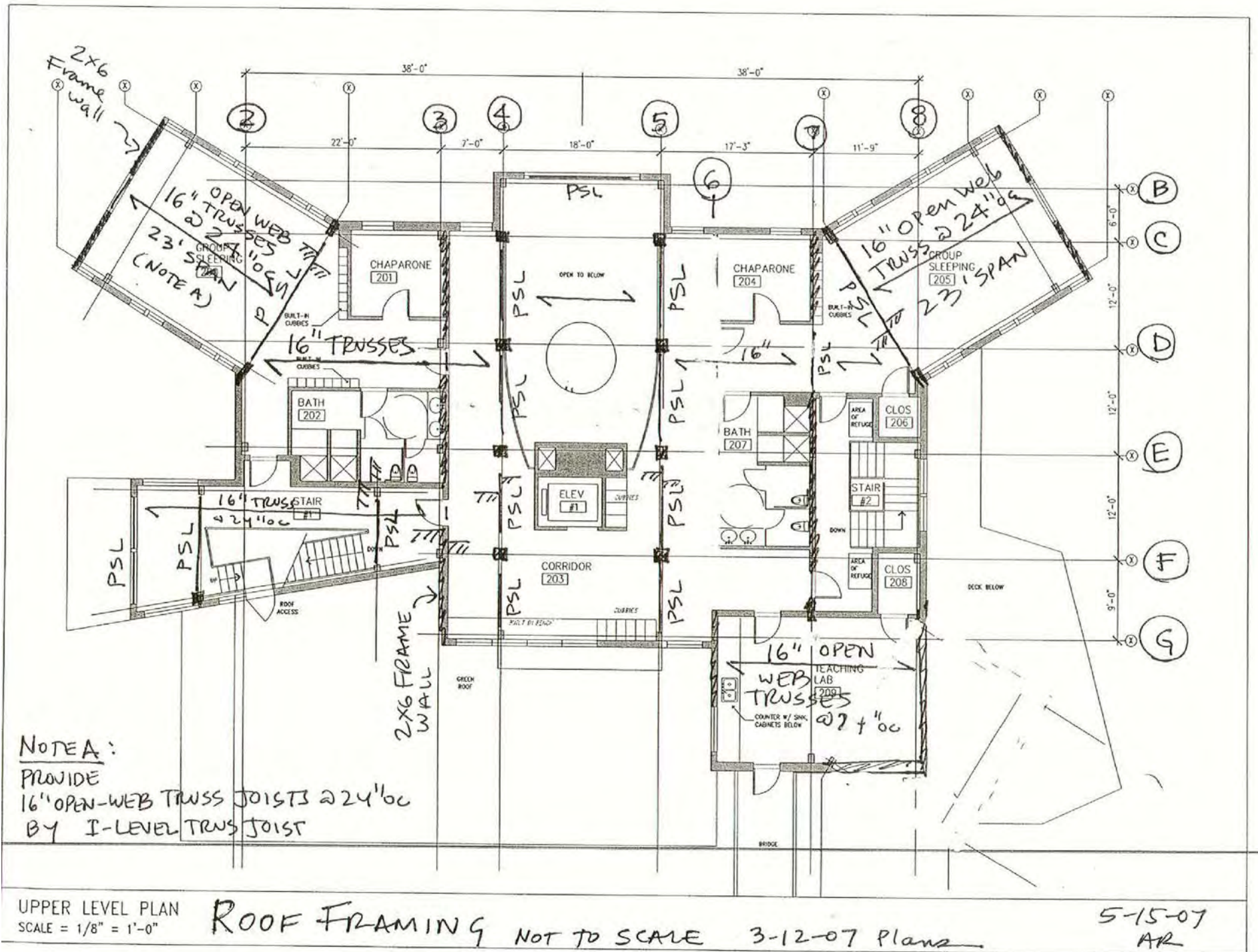
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MAIN LEVEL PLAN
 SCALE = 1/8" = 1'-0"
 3-12-07 Plans

UPPER FLOOR FRAMING
 N.T.S.

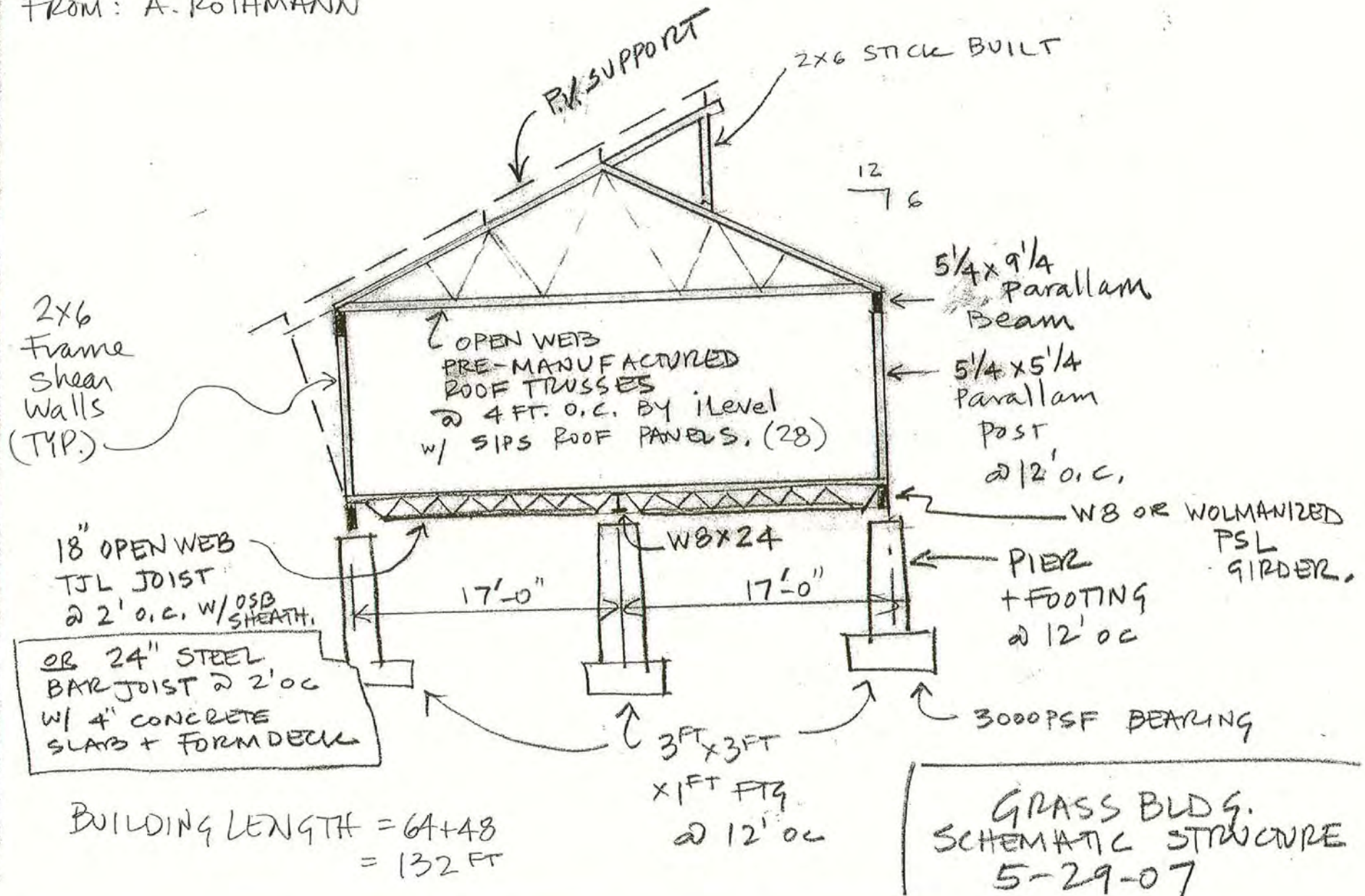
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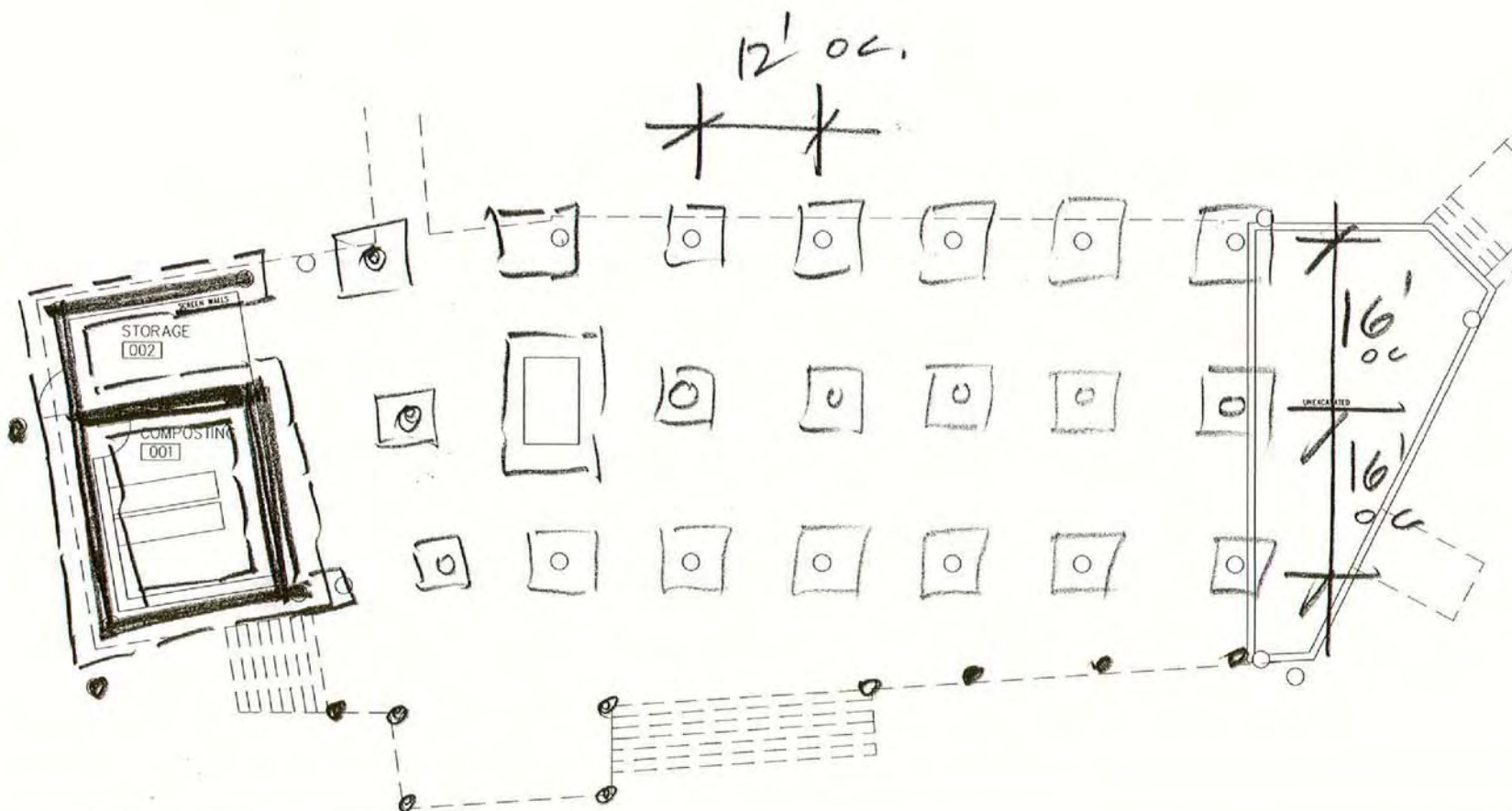


Fax 2 PAGES
TO MUSCOE MARTIN

cc: BILL CRAIG,

FROM: A. ROTHMANN





EL PLAN
1' = 0'

NTS

5-29-07

GRASS



AFF – Hard Bargain Farm – MEP Systems Description

October 21, 2008

1. Heating, Ventilation & Air Conditioning Systems (HVAC):

- a. The HVAC system shall be a ground coupled geo-exchange system. The system will utilize water source heat pumps to maintain the indoor environmental conditions. The geo-exchanger will consist of a well field of vertical bore holes with closed loop piping and thermal grout. Water source heat pumps shall be selected to exceed energy code requirements and shall be suitable for extended range duty with ground coupled systems. Refrigerants shall be non-HCFC. The geo-exchange wells shall be installed in the field to the south of the Grass building and will support the Grass Building, Moss Building and Sleeping Cabins.
- b. The Moss Building will utilize distributed heat pumps to provide individual zone control to each space. Central energy recovery ventilators will transfer heat from exhaust air streams to ventilation supply streams to reduce overall energy use. Individual space temperature, humidity, occupancy and CO2 sensors will be utilized to control the heat pumps. All heat recovery units in the Moss building will be provided with heating/cooling coils served by a water-to-water heat pump.
- c. The Grass building will utilize heat pumps, operable windows, ceiling mounted fans, exhaust fans and the PV array to provide for flexible operation depending on the weather conditions, use of the building and the occupancy. The systems will be designed to provide full mechanical heating and cooling utilizing the heat pumps. The occupants will have the option of utilizing ceiling mounted fans coupled with operable windows to maintain a comfortable indoor environment.

2. Electrical Systems:

- a. All buildings shall be supplied from a new 480 volts, 3-phase, 4-wire utility service originating from an outdoor pad-mounted 112.5 kVA utility transformer. The incoming service will be at the Grass building and will be distributed to all other buildings from a main distribution panel (MDP) in the Grass Building electrical room.
- b. A grid connected photovoltaic array will be located at the Grass building. The array will be tied into MDP for net metering. Based on estimated loads the PV array will be sized between 75 KVA and 100 KVA.

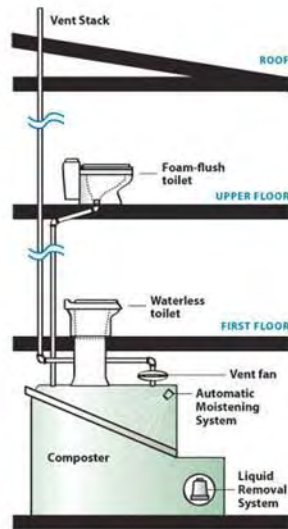
- c. Lighting systems will utilize efficient lamps and fixtures and will be provided with occupancy sensors, time clock override controls and day light dimming control where applicable.
 - d. Meters will be provided on key components of the electrical system to provide occupants with real-time data on the energy use of the buildings and allow them to adjust their behavior and use to meet the annual energy budget.
3. Plumbing Systems:
- a. All fixtures requiring potable water (lavatories, sinks, showers) will utilize ultra low-flow devices to limit the amount of potable water required on site.
 - b. Potable water will be provided by a rain water harvesting system collecting rain water from the Moss building roof. The rainwater will be filtered thru leaf screens and first flush diverters and stored in an 8,000 gallon cistern. The water will then be treated to potable water standards through particulate and activated charcoal filters and an ultra violet light treatment unit. This water system shall be routed to Moss, Grass and Sleeping Cabin buildings.
 - c. Hot water will be generated by electric water heaters. Instantaneous type will be utilized where appropriate. The viability of using solar thermal for hot water heating will be analyzed for the Moss building.
 - d. A Grey Water system will collect waste water from lavatories, sinks, showers, kitchen sinks and washing machines. The water will be filtered and stored in a holding tank prior to being distributed to garden irrigation chambers for final treatment.
 - e. All toilets will be composting type requiring no water for flushing purposes. Toilet waste and food scraps will be composted in the composting chambers located in the building basements and liquid waste will be piped to fertilizer tanks to be used for landscaping purposes. Solids will be decomposed and used for landscaping and fertilizer.
 - f. An existing on site well and pump will be utilized to provide a back-up domestic water source to rain water collection holding tank and to fill the sprinkler system water storage tank.
4. Fire Protection:
- a. The Moss building will be fully sprinklered. Water for the sprinkler system will be provided by a 20,000 gallon underground storage tank. The fire protection reserve will be 15,000 gallons. Make-up water to the tank will be provided by the existing well system. An electric fire pump will deliver water to the sprinkler system.



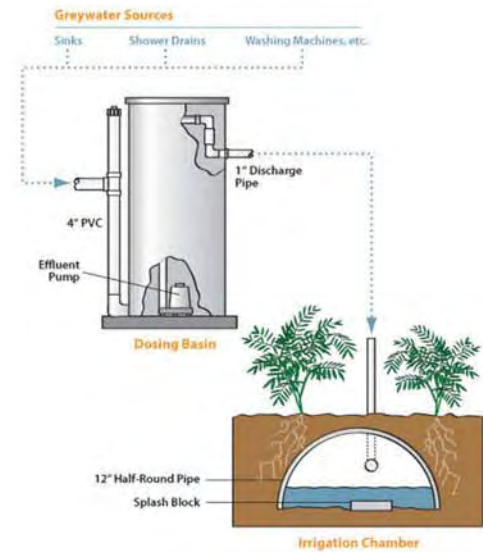
COMPOSTING TOILET



COMPOSTING TOILET
COLLECTION TANK



Clivus Multrum, Inc.



Clivus Multrum, Inc.

COMPOSTING OF TOILET WASTE (BLACKWATER)

USE COMPOSTING TOILETS TO COLLECT URINE AND FECES. SOLID WASTE UNDERGOES ACCELERATED DECOMPOSITION, RESULTING IN A VALUABLE SOIL AMENDMENT THAT POSES NO HEALTH RISKS. LIQUID WASTE (RICH IN NUTRIENTS/NITROGEN) CAN BE DIVERTED AND COMPOSTED AS WELL

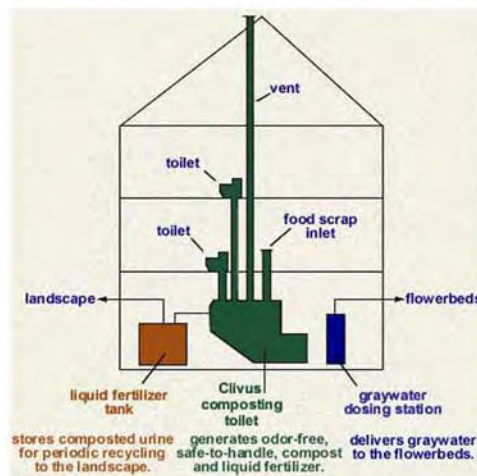
USE OF GRAYWATER FOR IRRIGATION AND GROUNDWATER RECHARGE

SEPARATE AND COLLECT GRAYWATER FROM SHOWERS, LAVATORIES AND CLOTHES WASHERS (AND MAYBE KITCHEN SINKS AND DISHWASHERS) AND DIRECT IT THRU UNDERGROUND PLANTING BEDS. GRAYWATER PROVIDES IRRIGATION AND ROOTS OF PLANTS CLEANSE GRAYWATER BEFORE IT INFILTRATES INTO THE GROUND



DUAL-FLUSH TANK TOILET (0.9/1.6 GPF)

DEPENDING ON INITIAL COST AND FEASIBILITY OF COMPOSTING TOILETS, LOW-FLOW WATER TOILETS CAN BE UTILIZED (IN-PART OR IN-FULL) AND FLUSHED USING COLLECTED RAINWATER. THIS SCENARIO IS NOT AS IDEAL DUE TO INCREASED ENERGY-USE REQUIREMENTS AND NEED FOR A CONVENTIONAL SEPTIC SYSTEM



NutriCycle Systems, LLC



FLOWER BED

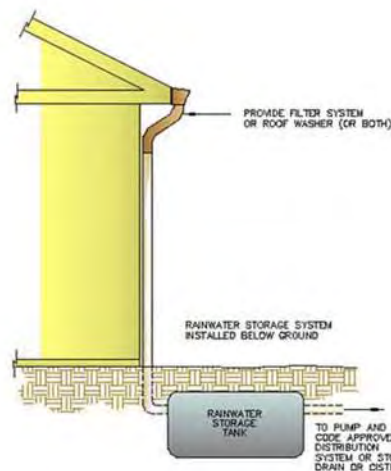


RAKING COMPOST

INTEGRATED WASTEWATER TREATMENT SYSTEM



EXTENDED SCUPPER & CISTERN



ULTRAVIOLET FILTRATION UNIT

TREATMENT OF COLLECTED RAINWATER TO POTABLE (or SEMI-POTABLE) STANDARDS

PURIFY RAINWATER COLLECTED FROM ROOF FOR USE AT SHOWERS, LAVATORIES, CLOTHES WASHERS AND POSSIBLY DRINKING FOUNTAINS AND KITCHEN SINKS. STATE-OF-THE ART FILTRATION EQUIPMENT SUCH AN ULTRAVIOLET DISINFECTION UNIT TO BE USED AND ROOFING MATERIAL TO BE SELECTED TO ENSURE SAFETY AND CLEANLINESS OF WATER SUPPLY

- Clivus[®] composting toilets
- Graywater systems
- Nutrients recycled to the landscape and agriculture

Bill Craig
Re: Vision Architecture
215.482.1133

CONCEPT PROPOSAL
NutriCycle[®] System

(Composting toilets, nutrients recycled to the landscape, graywater flowerbeds)

Hard Bargain Farm

Grass Center, Moss Lodge, Cabins (2)

Based on Plans dated 2/26/07 (Grass and Moss only), and Water Peak and Usage
Calculator from AKF Engineers
March 5, 2007

General Description: Composting toilets shall convert all human body products and food scraps (optional) into odor-free and safe-to-handle compost and liquid fertilizer for use in the landscape. Graywater shall be dosed to the root zone of vegetation in flowerbeds designed to enhance the landscape. With this NutriCycle System, nutrients are recycled to the land based food chain from which they came, with no health hazards, no pollution, no wasting of resources, no septic system, no sewer system, and for the lowest long term cost.

Composting Toilet Equipment (Clivus Multrum NSF approved):

Grass: **1-Model M35** serving 2 toilets and 2 urinals, AND **1 Model M3** serving the 2 handicapped toilets.

Moss Upper: **2-Model M3**; each composter located in the lower level directly under 2 toilets on the upper level, in each of 2 sleeping areas (chase for chutes).

Moss Main: **1-Model M35** located in the lower level directly under 2 toilets and 2 urinals on the main level, AND **1-Model M3** located next to the M35 and directly under the 2 handicapped toilets on the main level.

Cabins (2): **2-Model M3**, one in each cabin serving 2 toilets.

Compost Generated: About 10 bushels per year (all composters) after the first five years of use.

Compost Use: Shall be used as a soil amendment (nutrient recycling) by raking into the lawn, side dressing on ornamental vegetation or trees, or incorporating into the soil for landscape enhancement or agriculture, in accordance with all permits.

Liquid Fertilizer Generated and Stored (Ref: Calculator):

Grass: 100 people per week, times 2 uses per person, times 50 weeks per year, equals 10,000 uses per year, divided by 25 uses per gallon, equals 400 gallons per year, to accumulate in **1-400 gallon liquid fertilizer storage tank**, for landscape use 1 time per year or as needed.

Moss and Cabins: 30 people per day, times 5 uses per person, times 4 days per week, times 50 weeks per year, equals 30,000 uses per year, divided by 25 uses per gallon, equals 1,200 gallons generated per year; 70% attributed to Moss equals 840 gallons to accumulate in **1-800 gallon liquid fertilizer storage tank**, for landscape use 1 time per year or as needed; 30% attributed to the Cabins equals 360 gallons to accumulate in the 2 180-gallon liquid fertilizer storage bases of the 2 Model M3's, for landscape use 1 time per year or as needed.

The total liquid fertilizer generated and stored is 1600 gallons per year.

Landscape Use of the Liquid Fertilizer: Within 10 days of the receipt of lab results showing a fecal coliform count of 200/100ml or less from a storage tank, the liquid fertilizer is applied over the root zone of vegetation (lawn, ornamentals, trees, etc.) at a rate not to exceed 1 gallon per 4 square feet per year in order to assure complete nutrient uptake (nutrient recycling). 1,600 gallons per year, times 4 square feet per gallon, equals **6,400 square feet needed** (64 feet by 100 feet). Landscape use shall be in accordance with a Nutrient Recycling Permit (Maryland Department of the Environment Groundwater Discharge Permit), obtained with assistance from NutriCycle Systems (Ref: Dr. Tien, see Approving Authorities).

Graywater Flow, All Buildings (Ref: Calculator): Highest use day of the year: 16 showers at 7.5 gallons per shower equals 120 gallons; plus 44 people times 3 lavatory uses per person times .1 gallon per use, equals 13.2 gallons; plus 44 people times 1 kitchen sink use per person, times .125 gallons per use, equals 5.5 gallons; for a total of 138.7 gallons actual flow; plus a 100% safety factor for miscellaneous flow (drinking fountains, service sinks, special events) equals a graywater design flow of **300 gallons per day**.

Graywater Flowerbed: 300 gallons per day graywater flow, divided by 1.6 gallons per square foot graywater to topsoil application rate (Tyler Chart, low BOD for graywater), equals 187.5 square feet needed, or 4 1-foot wide by 50-foot long irrigation chambers, times 3 for a minimum of 1 foot growing area (nutrient recycling) on each side of the chambers, equals a **minimum flower bed area of 600 square feet** (12 feet by 50 feet), designed aesthetically into the landscape. Plans, profiles, details, and equipment schedules, will be provided by NutriCycle following site plan review and soils evaluations by the County. The typical system includes duplex alternating dosing equipment that sends a flooding dose (no septic tank, no perforated pipe, and no filtration) to the irrigation chambers in the flowerbeds.

Peak Use Capacity: The average daily usage capacity of the composters (660 uses per day) is higher than the peak buildings use (Ref: calculator; 172 people per day, times 3 uses per person, equals 516 uses per day) so there is no need for portable toilets during special events.

Back-up System Capability: by others. The Clivus systems do not need back-up because they are "conventional", have an indefinite life span, and do not require percolating soils for end-product use. The graywater flowerbed is a root zone system that is self-cleaning and should not require recovery area, however a recovery area is probably easy to establish.

Maintenance Summary: Weekly - add a 1 gallon scoop of pine shavings down each toilet; every 4 months - rake and level composting piles, inspect complete composting toilet/graywater system for proper operation, use liquid fertilizer if needed, use compost, if needed. NutriCycle Systems will provide an optional maintenance contract for the 4 month (March, July, November) maintenance needs, and an "Owners Manual."

Record Keeping: (by NutriCycle Systems and/or others): test Clivus liquid fertilizer, maintain activity log, and file quarterly reports, as required by permit.

Budgetary Estimate: Clivus equipment installed (2 Model M35, 6 Model M3); Clivus liquid fertilizer storage tanks installed (1-400gallon, 1-800 gallon); graywater dosing equipment set-up (1 dosing station); irrigation chambers installed (200 linear feet); assistance with permits, building plan review.....**\$96,000.**

Work by Others: small amount of plumbing, electric, and mechanical; all underground piping per Plan by NutriCycle Systems; construction of flower bed per Plan by NutriCycle Systems.

Design Fee for "Plan, NutriCycle System" following Health Department approval of this concept proposal, and following Health Department approval of "shallow perc tests" at the proposed graywater flowerbed location, and including all information and drawings needed for Health Department final NutriCycle System approval and proper NutriCycle System installation (See Contract For Plan Design).....**\$3,000.**

Enc: Clivus M35 Specification Sheet
Clivus M3 Specification Sheet
Graywater System Description
Actual Graywater Flows
Approving Authorities
Contract For Plan Design

USES OF FUNDS									
Predevelopment	41,000								
Fundraising	686,700								
Project Soft Costs & Design Phase	875,810	Enclosed		Non-enclosed		Total			
Construction Phase	7,048,000	Area		Area		Area			
Moss	3,500,000	12,754	SF	\$ 274	per SF	1,600	SF	14,354	\$ 244 per SF
Grass	1,250,000	3,010	SF	\$ 415	per SF	2,210	SF	5,220	\$ 239 per SF
Cabins	300,000	1,308	SF	\$ 229	per SF	-		1,308	\$ 229 per SF
Photovoltaics	628,000	17,072	SF	\$ 296	Avg/SF	3,810	SF	20,882	\$ 242 Avg/SF
AFF Boardwalk & Problem Solving Course	250,000								
Landscape and Site	600,000								
CA and LEED documentation	120,000								
Owner's Contingency	400,000								
Owner items	130,000								
Total Project	8,781,510								



Complex Overview



Birds' Eye View



Moss Entry



Moss North Elevation



North Elevation – Kids' Eye View



Green Roof – East View



Grass Front Elevation



Grass Back Elevation



Grass Up Hill View



Grass Breezeway

Living Building Challenge

In Pursuit of True Sustainability in the Built Environment

The Living Building Challenge was created by the The Cascadia Region Green Building Council (Cascadia) to address a changing context. The rapid adoption of green building rating systems (e.g., LEED), along with multiple projects achieving top levels of certification signal that the market has adopted sustainability. There are examples of superlative performance in specific areas but no whole buildings exist.

Overview of Challenge

The Living Building Challenge is comprised of 6 Petals which contain a total of 16 Requirements. All Requirements must be met to receive designation as a Living Building. The petals are:

Site

Energy

Materials

Water

Indoor Quality

Beauty + Inspiration

Projects must be fully operational for 12 months prior to certification. The certification is based on actual, not predicted, performance.

Site Design Petal

The continued outward spread of development and sprawl threatens the few wild places that remain. The decentralized nature of our communities increases transportation impacts and pollution. As flat, prime land for construction diminishes, more and more development tends to occur in sensitive areas that are easily harmed or destroyed. Invasive species threaten ecosystems, which are already weakened by the constant pressure of existing development. The intent of this Petal is to clearly articulate where it is acceptable to build and how to protect and restore a place once it has been developed and degraded.

Prerequisite 1 - Responsible site selection

No building on, or adjacent to, sensitive ecological habitats (wetlands, primary dunes, old growth forest, or virgin prairie), prime farmland or within 100-yr floodplain.

Prerequisite 2 - Limits to growth

The project must be built only on greyfield or brownfield sites developed prior to December 31, 2007.

Prerequisite 3 - Habitat exchange

For each acre of development, an equal amount of land must be set-aside for at least 100 years as part of a habitat exchange.

Energy Petal

The majority of energy generated today is from unsustainable sources including coal, gas, oil and nuclear energy. Large-scale hydro, while inherently cleaner, brings widespread damaging ecosystem impact. The effects of these energy sources on regional and planetary health is becoming more and more evident, with climate change being the most worrisome of major global trends due to human activity. The intent of this prerequisite is to signal a new age of design, whereby all buildings rely solely on renewable forms of energy and operate year in and year out in a pollution-free manner. Since renewable energy sources are inherently more expensive than energy efficiency measures, efficiency as a first step is assumed.

Prerequisite 4 - Net zero energy

One hundred percent of the building's energy must be supplied by on-site renewable sources on a net annual basis.

Materials Petal

The environmental issues surrounding materials are numerous and include health and toxicity, embodied energy, pollution and resource depletion. The intent of these prerequisites are to remove, from a health and pollution standpoint, the worst known offending materials, and to reduce and offset the environmental impacts associated with the construction process. At the present time it is impossible to gauge the true environmental impact and toxicity of the buildings we create.

Prerequisite 5 - Materials Red List

Using the precautionary principle and established toxicity data, certain chemicals and materials should be excluded from building products.

The project can not contain any of the following chemicals and materials:

- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorofluorocarbons (CFCs)
- Formaldehyde (added)
- Halogenated Flame Retardants
- Hydrochlorofluorocarbons (HCFCs)
- Lead
- Mercury
- Petrochemical Fertilizers and Pesticides
- Phthalates
- Polyvinyl Chloride (PVC)
- Wood treatments containing Creosote, Arsenic or Pentachlorophenol

The following table describes some replacement options for Polyvinyl Chloride (PVC)

Common use area	Replacement Option
Plumbing (piping and fittings)	Polyethylene (PEX), polypropylene, copper
Electrical wiring	Polyolefin
Window/door frames	Wood, metal-clad wood, aluminum
Fabric and wall coverings	Polyester, acrylic, nylon
Carpet (backing)	Jute (grasses), polyolefin, polyethylene, polypropylene
Resilient flooring	Linoleum, rubber, cork
Siding	Wood, fiber cement
Signage	Metal, acrylic
Roofing	Metal, fiber cement shingles, vegetated roof
Cabinetry (e.g. edge banding)	Soy-based derivative, metal, wood
Decking	Polyethylene plastic, wood

Prerequisite 6 - Construction Carbon Footprint

The project must account for the embodied carbon footprint of its construction through a one-time carbon offset tied to the building's square footage and general construction type.

Prerequisite 7 - Responsible Industry

All wood must be certified by the Forest Stewardship Council (FSC), from salvaged sources, or the intentional harvest of timber onsite for the purpose of clearing the area for construction.

Prerequisite 8 - Appropriate materials/services radius

Materials and services must be sourced from specific radii based on factors such as density of material and impact of product on a building's operational efficiency.

Prerequisite 9 - Leadership in Construction Waste

Diversion of construction waste from landfills must meet specific minimums:

- Metals, paper, cardboard: 95%
- Soils and biomass: 100%
- Rigid foam, insulation, carpet: 90%
- 80% combined weighted average diversion rate for all other materials.

Water Petal

Scarcity of clean potable water is quickly becoming a serious issue in many countries around the world. Most regions of the United States and Canada have avoided the majority of these limitations and problems to-date due to the presence of abundant fresh water, but highly unsustainable water use patterns and the continued draw-down of major aquifers portend significant problems ahead. These prerequisites realign how people use water in the built environment, so that water is respected as a precious resource.

Prerequisite 10 - Net Zero Water

One hundred percent of water for occupant use must come from captured precipitation or closed loop water systems that account for downstream ecosystem impacts and that are appropriately purified without the use of chemicals.

Prerequisite 11 - Sustainable Water Discharge

One hundred percent of storm water and building water discharge must be managed on site and integrated into a comprehensive system to feed the project's demands.

Indoor Quality Petal

Most buildings provide far less than ideal conditions for maximum health and productivity. As comfort decreases, environmental impact often increases, as people find inefficient and wasteful solutions to improve their physical environment. The intent of these prerequisites is not to address all of the potential ways that an interior environment could be compromised, but to focus on best practices to create a healthy interior environment.

Prerequisite 12 - Civilized Environment

Every space intended for occupation must have operable windows that provide access to fresh air and natural light.

Prerequisite 13 - Healthy Air/Source Control

All buildings must meet the following criteria:

- Entryways must have an external dirt track-in system and an internal one contained within a separate entry space.
- All kitchens, bathrooms, copy rooms, janitorial closets and chemical storage spaces must be separately ventilated.
- All interior finishes, paints and adhesives must comply with SCAQMD 2007/2008 standards. All other interior materials such as flooring and case works must comply with California Standard 01350 for IAQ emissions.
- The building must be a non-smoking facility.

Prerequisite 14 - Healthy Air-Ventilation

The building must be designed to deliver air change rates in compliance with California Title 24 Requirements.

Beauty + Inspiration Petal

As a society we are often surrounded by ugly and inhumane physical environments. If we do not care for our homes, streets and offices then why should we extend care outward to our farms, forests and fields? When we accept billboards, parking lots and strip malls as being aesthetically acceptable, in the same breath we accept clear-cuts, factory farms and strip mines. The Living Building Challenge recognizes the need for beauty as a precursor to caring enough to preserve, conserve and serve the greater good.

Prerequisite 15 - Beauty + Spirit

The project must contain elements intended solely for human delight and the celebration of culture, spirit and place appropriate to the function of the building.

Prerequisite 16 - Inspiration + Education

Educational materials about the performance and operation of the project must be provided to the public to share successful solutions and to motivate others to make change. Non-sensitive areas of the building must be open to the public at least one day per year, to facilitate direct contact with a Living Building.



Potomac River Habitat Study Complex
Green Design Charrette
Day 3 – November 7, 2006

EDUCATIONAL CONNECTIONS GROUP

- Food – planting, growing
 - Greenhouse
 - Children's garden (relocate to within sight of the buildings)
 - Green roofs
 - Window boxes
 - Eating of food from greenhouse
 - Start-a-seed, newspaper mold
- Composting
 - Composting station
 - Composting toilets
 - Vermacomposting that is visible (one clear side)
 - Pig bucket
 - "Compost only"
 - Relocate, more accessible to the building
 - Producer/consumer/decomposer label
- Energy
 - Interactive pond for solar mass
 - Crank flashlights
 - Bicycle to turn something on
 - Occupancy sensors (with on/off switch)
 - Foot pedal for water use – caution, machinery can break easily
 - Pull chain for shower
 - Tokens for showers – watch water use
 - Use hand operated dumbwaiters for elevation of stuff
- Water
 - Cistern/rain barrel
 - Watch infiltration in various medias
- Building Manipulation
 - Night shutters
 - Equinox indicators, signposts, celebration
 - Convection spirals – watch stack effect work anemometer
 - Weather vanes, Flags – watch breezes work
 - Evening space is cozy (lodge) – getting back to nature



- Reflective, solar lights, etc. – to provide low levels of light at night where needed for navigation and discourage use of other lights (more conventional type) – preserve areas of darkness as new experience for urban students
- Native American trail trees as signage
- Doors – some labeled, some not – building as scavenger hunt
- Straw bale
 - Open to see guts
 - Thermometers to see temperature differentials
- Flora & Fauna
 - Succession of trees – show on floorboards, then as mural along walls
 - Built in aquaria – observe without touching – locked access from the back of classroom
 - Indigenous species – all native plants labeled
 - Herbarium wall
 - Biodiversity board – use trees from the farm - felt board
 - Constructed wetland, attract wildlife – close to the building
 - Bird houses, bat houses, butterflies (native plants), apiary
- Cultural Components
 - Tie into social studies standards
 - Technology through time
 - Use old farm artifacts for architectural parts
 - “Discs” to mobile, lighting, etc.
 - Saddle seats, tractor seats, incorporate old tools
 - “Milk door” for composting/recycling with signage
- Stations
 - 3-D map of the site (waterproof) permanent/outside and surrounding area “sculpture”
 - Rain garden
 - Disconnected roof leaders – watch how water flows
 - Rain chains with measuring device (mark weekly)
 - Rain barrel cisterns
 - Gargoyles
 - Transparent water use – composting toilets, grey water, constructed wetland, follow the water flow
- Outdoor Teaching Areas
 - Gazebo – circle
 - Covered area for 10-15 max, crude seating, table
 - 10-30 minute lessons
 - Broad overhangs for rain
 - “Longhouse” or palisaded fence around children’s garden
 - Site geology shown in fireplace

- Phytofiltration – built in plantings to purify
- Low vegetated roof that connects to cistern to compare with impervious roof
- Satellite with tubes to hear different frequencies and magnify them, disc at birdfeeders to amplify sounds
- “Hunter-Gatherer”
 - Water pump in the kitchen or bathroom
 - Themed areas ... different eras
 - Life of a planet display
 - Producers, consumer, decomposer
 - Food web
- Boardwalk
 - Bird blinds – boardwalk
 - Viewing scope at boardwalk
 - Viewing platform at boardwalk
- Assembly for team building – “make your beds”
- Interactive displays in lodging common areas
- Additional campfire closer to the building